



TRAFFIC AND PARKING ASSESSMENT

**ALTERATIONS AND ADDITIONS
NEWCASTLE GRAMMAR SCHOOL PARK CAMPUS
MASTERPLAN AND STAGE 1 WORKS**

**LOT 102 DP861562
127 UNION STREET, COOKS HILL**

PREPARED FOR: NEWCASTLE GRAMMAR SCHOOL

AMENDED MARCH 2022

20/027

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127 UNION STREET, COOKS HILL**

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Date 12th April 2022**Disclaimer**

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1.0 INTRODUCTION

Intersect Traffic Pty Ltd has been engaged by APP Corporation on behalf of Newcastle Grammar School to prepare a Traffic and Parking Assessment for alterations and additions to the Newcastle Grammar School Park Campus which currently provides schooling for children from Kindergarten to Year 4. The school is seeking to provide additional buildings on the site to increase student numbers from its current capacity of approximately 256 students and 35 staff to 480 students and 50 staff as part of Stage 1. It is anticipated that the future DA for Stage 2 would enable an additional 160 students and 10 staff, resulting in a Stage 2 capacity of 640 students and 60 staff. This application seeks to assess the traffic impacts of the masterplan as well as the Stage 1 works which will result in the campus catering for Kindergarten to Year 6 classes. The concept masterplan and stage 1 works development plans are provided in **Attachment A**. These plans show both the vehicle and pedestrian accesses to the site.

This report is provided to support a State Significant Development application to the Department of Planning, Industry and Environment (DPIE) as the consent authority. It allows the Department as well as Newcastle City Council (Council) and Transport for NSW (TfNSW) officers to assess the proposal in respect of its impact on the local road network and the amenity of nearby properties.

This report presents the findings of the traffic and parking assessment and includes the following.

1. An outline of the existing situation in the vicinity of the site.
2. Describes the proposed development.
3. Assesses the impact of the development on the capacity of the adjoining local and state road network.
4. Reviews parking and access along with alternate transport mode impacts of the proposed development, including assessment against Council and Australian Standards requirements.
5. Presentation of conclusions and recommendations.

2.0 SITE DESCRIPTION

The subject site is shown in **Figure 1** below. It is located between Union Street and Corlette Street immediately north of Parkway Avenue approximately 400 metres north-east of The Junction CBD and 1.7 km south-west of the Newcastle CBD. The site currently contains a number of separate educational buildings which make up the Newcastle Grammar School Park Campus.

The site has a total area of approximately 9,300 m² and is most commonly addressed as 127 Union Street, Cooks Hill. Pursuant to the Newcastle LEP (2012) the site is zoned as R3 Medium Density Residential.

The site currently has no existing off-street car parking with vehicular access only available for servicing and maintenance periods via an existing access off Union Street. **Photograph 1** below shows the existing on-site development from Parkway Avenue while **Photograph 2** shows the existing vehicular access and development off Union Street.



Figure 1 – Site Location



Photograph 1 – Development site from Parkway Avenue



Photograph 2 – Vehicular access and development off Union Street.

3.0 ROAD NETWORK

3.1 Union Street

Union Street is a major local collector / distributor road that collects and distributes traffic from the Cooks Hill and The Junction areas to the arterial and sub-arterial road network in Newcastle and The Junction. As a local road it is under the care and control of Newcastle City Council and is a major transport route into the Newcastle City Centre area.

Near the site it is typically a two-way two-lane undivided sealed urban road with kerb and gutter with additional turning lanes at major intersections. It has a sealed carriageway 13 metres wide which provides a single lane of travel in both directions (3.7 metre wide) and parking lanes on both sides (2.8 metres wide). A 60 km/h speed zoning exist along the road except past the school and another catholic school south of the site where a variable school speed zone reduces the speed to 40 km/h during the peak school drop off and pick up times of 8 am to 9.30 am and 2.30 pm to 4.00 pm. At the time of inspection Union Street was found to be in good condition as shown in **Photograph 3** below.



Photograph 3 – Union Street along site frontage.

3.2 Parkway Avenue

Parkway Avenue is a major local collector / distributor road that collects and distributes traffic to the arterial and sub-arterial road networks from the Bar Beach, Cooks Hill, The Junction, Hamilton and Hamilton South areas. As a local road it is under the care and control of Newcastle City Council and is a major transport route in the inner Newcastle City area.

Near the site it is typically a two-way two-lane divided sealed urban road with kerb and gutter with additional turning lanes at major intersections. It has sealed divided carriageways 6.5 metres wide which provides a single lane of travel in each direction (3.7 metre wide) and parking lanes on both

carriageways (2.8 metres wide). The central carriageway which is 17 metres wide is grassed and carries one of the major trunk drainage channels in the Newcastle area. A 60 km/h speed zoning exist along the road except past the school where a variable school speed zone reduces the speed to 40 km/h during the peak school drop off and pick up times of 8 am to 9.30 am and 2.30 pm to 4.00 pm. At the time of inspection Parkway Avenue was found to be in good condition as shown in **Photograph 4** below.



Photograph 4 – Parkway Avenue along site frontage.

3.3 Corlette Street

Corlette Street is a local urban road in the Cooks Hill area that provides vehicular access to properties along its length. As a local road it is under the care and control of Newcastle City Council.

Near the site it is typically a two-way two-lane undivided sealed urban road with kerb and gutter. It has a sealed carriageway 9 metres wide which provides a single lane of travel in each direction (3.0 metres wide) whilst allowing some on-street car parking along its length. A permanent 40 km/h speed zoning exist along the road as it is marked as an on-road cycle way. At the time of inspection Corlette Street was found to be in good condition as shown in **Photograph 4** below.

4.0 ROAD NETWORK IMPROVEMENTS

There are no known road upgrades in the vicinity of the site that will increase the capacity of the local road network. Maintenance works on the road network would be carried out in line with Newcastle City Council and TfNSW works programs.



Photograph 5 – Corlette Street along site frontage.

5.0 EXISTING TRAFFIC VOLUMES

Northern Transport Planning and Engineering on behalf of Intersect Traffic undertook intersection counts at the Union Street / Parkway Avenue traffic signals and the Parkway Avenue / Corlette Street priority controlled give way intersection during the school AM and PM peak periods in November and early December 2020 to allow intersection analysis of the operation of these intersections in this assessment. However these counts can be used to extract current mid-block peak hour (school) traffic volumes on the road network and extrapolate the data to predicted 2030 traffic volumes using a background traffic growth rate of 1.5 % per annum which is the TfNSW adopted background traffic growth rate for the lower Hunter area. The data sheets from the traffic counts are provided in **Attachment C**. The relevant two-way mid-block traffic volumes extracted and extrapolated from these counts is shown in **Table 1** below.

Table 1 – Existing and 2031 traffic volumes road network.

Road	Section	2021 AM peak vtp/h	2021 PM peak vtp/h	2031 AM peak vtp/h	2031 PM peak vtp/h
Union Street	south of Parkway Avenue	691	605	802	702
Union Street	north of Parkway Avenue	791	654	918	759
Parkway Avenue	west of Union Street	829	659	962	765
Parkway Avenue	Union St to Corlette St	786	683	912	793
Parkway Avenue	east of Corlette Street	670	583	778	677
Corlette Street	south of Parkway Avenue	127	125	147	145
Corlette Street	north of Parkway Avenue	169	101	196	117

These existing and future peak hour (school) traffic volumes on the local road network have been adopted in this assessment.

6.0 ROAD CAPACITY

The capacity of urban roads is generally determined by the capacity of its intersections. However, Table 4.3 of the RTA's *Guide to Traffic Generating Developments* provides some guidance on mid-block capacities for urban roads for a LoS C. This table is reproduced below.

Table 4.3
Typical mid-block capacities for urban roads with interrupted flow

Type of Road	One-Way Mid-block Lane Capacity (pcu/hr)	
Median or inner lane:	Divided Road	1,000
	Undivided Road	900
Outer or kerb lane:	With Adjacent Parking Lane	900
	Clearway Conditions	900
	Occasional Parked Cars	600
4 lane undivided:	Occasional Parked Cars	1,500
	Clearway Conditions	1,800
4 lane divided:	Clearway Conditions	1,900

Source: - RTA's *Guide to Traffic Generating Developments* (2002).

Noting the road network around the site is typically two-way two-lane undivided and divided roads the following capacities are determined from the above table.

Union Street – two-lane undivided carriageway with parking lanes – one way mid-block capacity – 900 vtpd therefore two-way mid-block capacity – 1,800 vtpd.

Parkway Avenue – two-lane divided carriageway with parking lanes – one way mid-block capacity – 1,000 vtpd therefore two-way mid-block capacity – 2,000 vtpd.

Corlette Street – two-lane undivided carriageway with occasional parked cars – one way mid-block capacity – 600 vtpd therefore two-way mid-block capacity – 1,200 vtpd.

These two-way mid-block road capacities have been adopted in this assessment. As these are above the existing peak hour traffic volumes recorded on the local road network (see **Section 5**) then it can be concluded that subject to satisfactory intersection performance the local road network has some spare capacity to cater for future development in the area.

7.0 ALTERNATE TRANSPORT MODES

Newcastle Transport (Keolis Downer) runs both school bus services and public transport (bus) services in the area while the school is also serviced by school buses provided by Hunter Valley Buses and Port Stephens Coaches. A review of the route maps and timetables for the public bus service indicates that the site is serviced by public transport as shown in the bus route extract shown in **Figure 2** below. The route most convenient to the site is;

- Route 12 – Maryland to Merewether Beach via Wallsend and Newcastle Interchange. This route runs from Merewether Beach along Union Street past the site, past Marketown to the Newcastle Transport Interchange then to Maryland via Wallsend. It provides a suitable public transport bus service to the site from most parts of Newcastle and the Central Coast with its connection to the Newcastle Transport Interchange. This route therefore provides

significant benefit to the school, making public transport trip making more attractive to staff and some students.

The nearest bus stops are located adjacent to the school on Union Street (school frontage for southbound services and 20 metres south of the school for northbound services) as shown in **Photograph 6** which also shows the asphalt footpath along the frontage of the site in Union Street.



Photograph 6 – Bus stop and asphalt footpath – southbound Union Street

The school also operates its own school bus services providing six (6) services that service all the Newcastle, Lower Hunter and Port Stephens areas. The basic details of routes are provided below in **Figure 3**. There are also a number of state operated school services that service the school for which students can use.

An excellent concrete and asphalt footpath network exist within the local road network around the site and connecting to the local bus stops, The Junction CBD and Newcastle city centre area ensuring suitable infrastructure for pedestrians in the area. The pedestrian infrastructure around the school is shown in **Photographs 6 and 7**. Safe pedestrian crossing of both Union Street and Parkway Avenue is provided with pedestrian phases in the Union Street / Parkway Avenue traffic signals and a marked pedestrian crossing also exists on Union Street immediately north of Tooke Street 160 metres north of the school (see **Photograph 8**).

Corlette Street is marked as an on-road cycle way as shown in **Photograph 9** and has a 40 km/h speed limit to improve cyclist safety on this road. Cyclists using the site could utilise the existing Newcastle cycle ways network to access the site up Corlette Street.

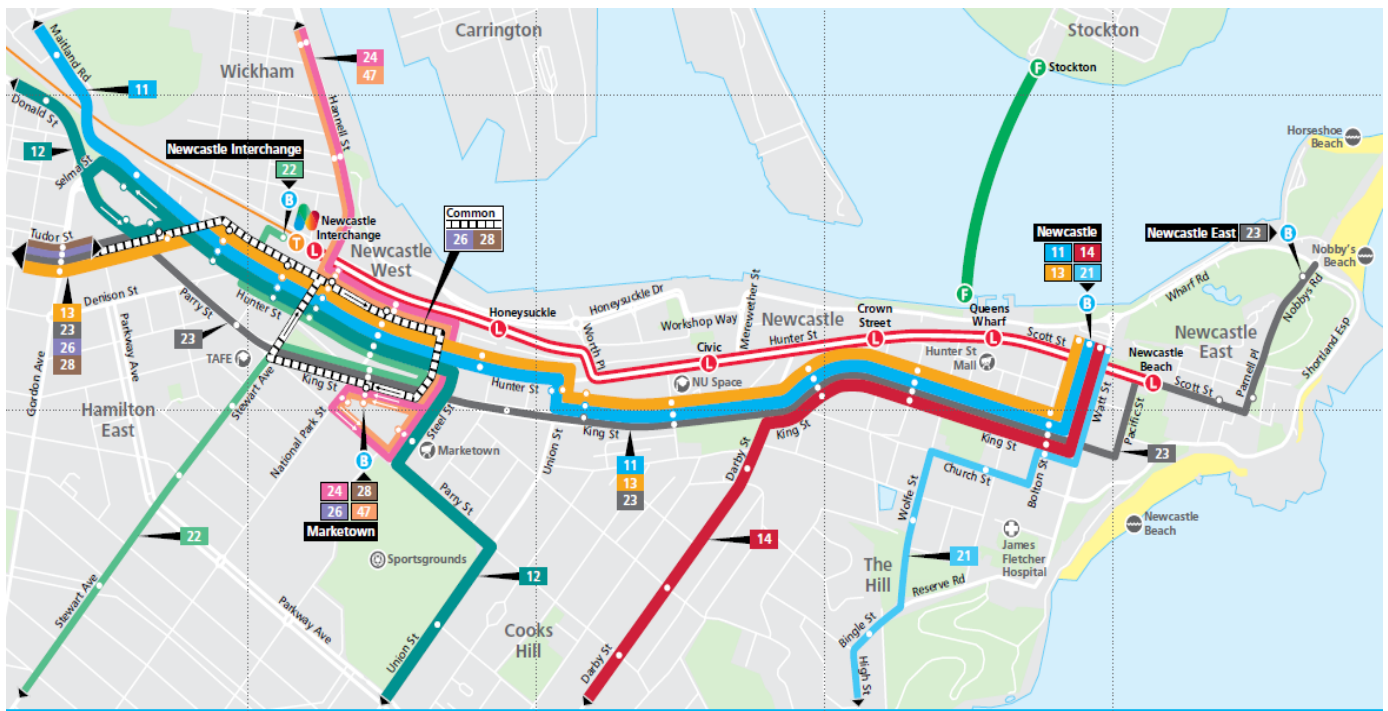
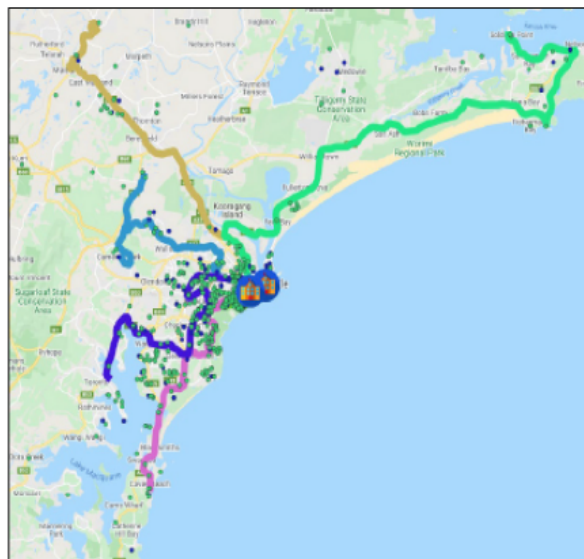


Figure 2 – Bus route Map Extract

Bus Routes

We currently have six bus routes running to and from school:
[Transport | Newcastle Grammar School \(ngs.nsw.edu.au\)](https://transport.newcastlegrammarschool.nsw.edu.au)



Port Stephens	Maitland	Minmi	Toronto	Caves Beach	Jewells
Mayfield Kooragang Fern Bay Williamtown Fisherman's Bay Nelson Bay Soldier's Point	Mayfield Hexham Beresfield Metford Maitland Bolwarra	Broadmeadow Waratah Birmingham Gardens Wallsend Fletcher Cameron Park Black Hill	Broadmeadow Kotara Charlestown Gateshead Warners Bay Teralba	Merewether Heights Kahibah Whitebridge Dudley Jewells Belmont Swansea	Park Campus Burwood Road Dudley Redhead Jewells

Figure 3 – School Bus Services operated by NGS



Photograph 7 – Pedestrian footpath Parkway Avenue along site frontage



Photograph 8 – Pedestrian crossing facilities Union Street / Parkway Avenue Signals



Photograph 9 – Marked cycleway – Corlette Street

8.0 DEVELOPMENT PROPOSAL

The development involves the approval of a masterplan for the future development of the Newcastle Grammar School Park Campus to a four stream primary school catering for Kindergarten to Year 6 students. This will increase student and staff numbers at the school from the current enrolment capacity of 256 students and 30 staff to 640 students and 60 staff. However the current development application also seeks approval to commence stage 1 works which will bring the school to full three stream school catering for Kindergarten to Year 6 students with 480 students and 50 staff. Note the school operates generally during school terms – Monday to Friday between 8 am and 4 pm.

Additionally, the site has an onsite before and after school service operating between 7:15am and 9am and 3pm-6pm, with capacity for 80 students. Vacation care is also provided during school holiday periods, between 8am-6pm.

Specifically works within the application involves;

Masterplan

- Demolition of four smaller existing buildings on the site as well as associated shade structures and landscaping.
- Refurbishment and/or expansion of the remaining buildings to provide additional and improved staff and administration facilities, as well as an improved library and specialist learning facilities.
- Construction of two new educational buildings each with 2 learning levels.
- Provision of a semi-basement car park for staff and visitor car parking containing 37car parks including 2 accessible spaces.
- Provision of a new under croft play area and rooftop sports courts.

- Provision of a new one-way traffic flow kiss and ride drop off and pick up internal road with new access crossings to Corlette Street (entry) and Union Street (exit).
- Improved pedestrian access from Union Street, Parkway Avenue and Corlette Street; and
- Drainage and landscaping to DPIE and Newcastle City Council requirements.

Stage 1 construction works for which approval is being sought involves;

- Demolition of existing structures to allow for Stage 1 works
- Refurbishment of an existing building (Block B) to provide additional and improved staff and administration facilities.
- Construction of one new educational building fronting Union Street with 2 learning levels.
- Provision of a new one-way traffic flow kiss and ride drop off and pick up internal road with new access crossings to Corlette Street (entry) and Union Street (exit).
- Improved pedestrian access from Union Street, Parkway Avenue and Corlette Street; and
- Drainage and landscaping to Newcastle City Council requirements.

The development concept plans for the proposal are provided in **Attachment A**.

9.0 TRAFFIC GENERATION AND TRIP DISTRIBUTION

The *RTA's Guide to Traffic Generating Developments (2002)* provides guidance on the traffic generating potential of developments. However this guide does not provide any data for primary schools and reference is then made to the Institute of Transportation Engineers (ITE) USA rates.

Common rates from the ITE's publication are provided in **Attachment F** and for private schools (K – 8) it recommends a rate of 0.28 trips per student. However, TfNSW have queried this rate and advised that they would prefer to see the rates of 1.2 trips per student adopted for the AM peak and 1.0 trips per student for the PM peak.

Masterplan

Completion of the development as per the full Masterplan will result in the following increase to staff and student numbers;

Students – 384
Staff - 25

Therefore the additional traffic expected from the full development of the school can be calculated as;

Additional AM peak hour traffic = $384 \times 1.2 = 460.8$ vtph.
Additional PM peak hour traffic = $384 \times 1.0 = 384$ vtph.

Stage 1

Completion of Stage 1 development will result in the following increase to staff and student numbers;

Students – 224
Staff - 15

Accordingly, the additional traffic from Stage 1 can be calculated as.

Additional AM peak hour traffic = $224 \times 1.2 = 269$ vtph.
Additional PM peak hour traffic = $224 \times 1.0 = 224$ vtph.

The trip distribution for the additional traffic is based on equal distributions from all directions north, south, east and west. Therefore in terms of the main intersections near the school the additional traffic generated by the development is as shown in **Figure 4** below also noting that 60 % are inbound and 40 % are outbound trips in the AM peak which is mirrored in the PM peak.

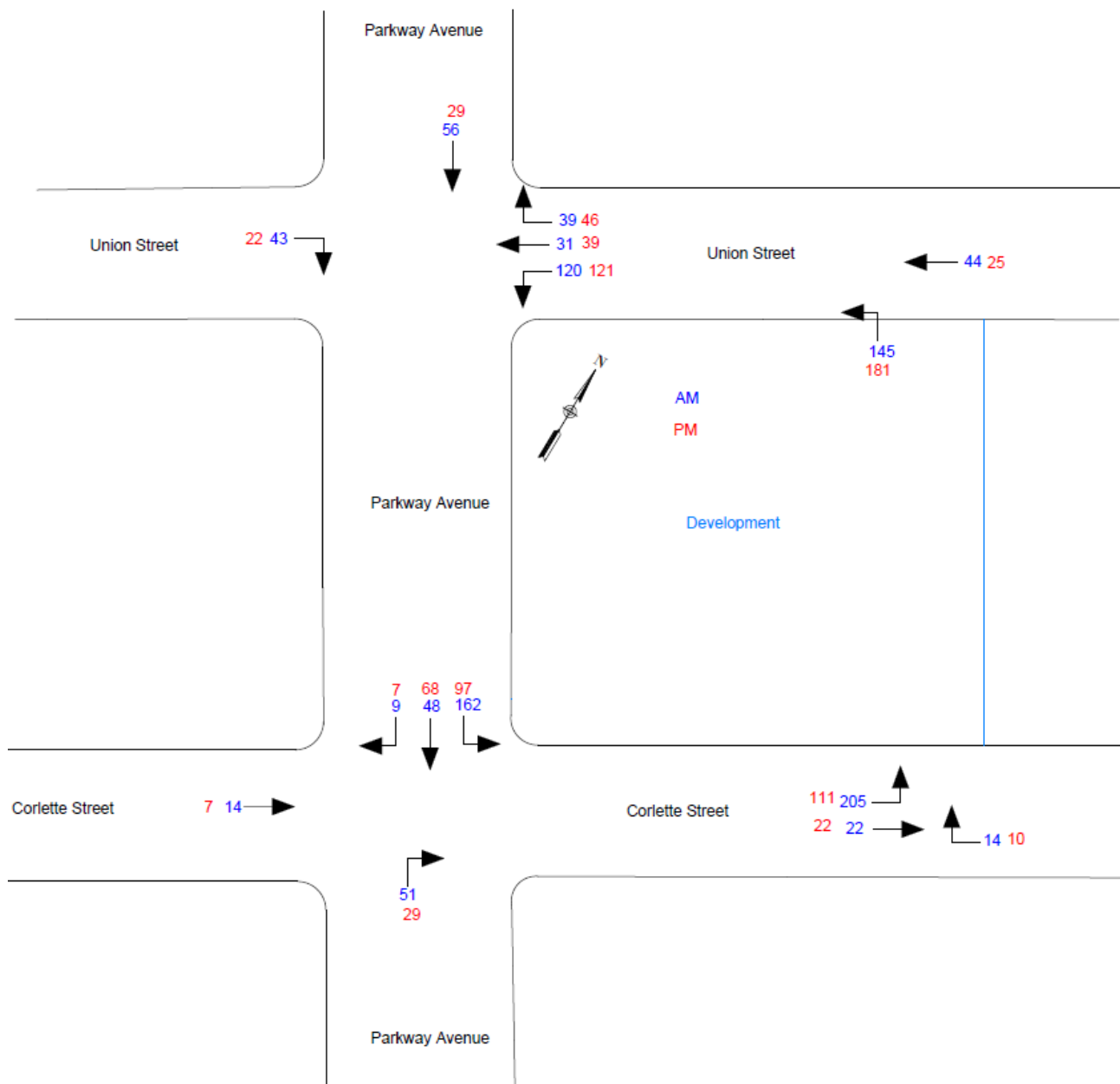


Figure 4 – Additional Development Peak Hour Traffic Trip Distribution – Full Development

10.0 TRAFFIC IMPACTS

Two-way Mid-Block Capacity

Section 6 of this report determined that the existing network was operating within its two way mid-block capacity while Section 9 has determined that the proposed Masterplan development will add the following traffic onto the adjacent road network.

Union Street south of Parkway Avenue – 74 vtpd in the AM and 61 vtpd in the PM peaks

Union Street north of Parkway Avenue – 190 vtpd in the AM peak and 206 vtpd in the PM peak.

Parkway Avenue west of Union Street – 95 vtpd in the AM peak and 75 vtpd in the PM peak.

Parkway Avenue - Union St to Corlette St – 219 vtp/h in the AM peak and 172 vtp/h in the PM peak.
Corlette Street – north of Parkway Ave – 227 vtp/h in the AM peak and 133 vtp/h in the PM peak.
Corlette Street – south of Parkway Ave – 23 vtp/h in the AM peak and 14 vtp/h in the PM peak.

The additional traffic from the development does not result in the two-way mid-block road capacities for the adjacent road network to be exceeded even through to 2031 as shown in **Table 2** below.

Table 2 – Two-way mid-block road capacity assessment.

Road	Section	Capacity vtp/h	2021 AM peak vtp/h	2021 PM peak vtp/h	2031 AM peak vtp/h	2031 PM peak vtp/h	Development	
							AM	PM
Union Street	south of Parkway Avenue	1800	765	666	876	763	74	61
Union Street	north of Parkway Avenue	1800	981	860	1108	965	190	206
Parkway Avenue	west of Union Street	2000	924	734	1057	840	95	75
Parkway Avenue	east of Union Street	2000	1005	855	1131	965	219	172
Corlette Street	south of Parkway Avenue	1200	354	258	374	278	227	133
Corlette Street	north of Parkway Avenue	1200	192	115	219	131	23	14

This shows that subject to satisfactory intersection performance the local road network around the school has sufficient spare network capacity to cater for the proposed development.

Intersection Capacity

The main intersections impacted by the proposal will be the Union Street / Parkway Avenue signalised intersection and the Parkway Avenue / Corlette Street priority controlled stop intersection. To determine the impact of this development on these intersections they have been modelled as a network using the Sidra Intersection 9 model. This software package predicts likely delays, queue lengths and thus levels of service that will occur at intersections. Assessment is then based on the level of service requirements of TfNSW shown below. Modelling was undertaken for the 2021 and 2031 AM and PM peak school periods with and without the school development. In undertaking this modelling it is assumed;

- The models were developed for the as constructed and operating intersections;
- Traffic count data was as collected by NTPE in November and December 2020;
- A 1.5 % per annum background traffic growth was assumed for 2031 models; and
- Stage1 development (additional 224 students) for current traffic was also modelled for the Union Street / Parkway Avenue intersection with development traffic trip distribution representing 74% of the final traffic distribution shown in **Figure 4**.

The results of the Sidra modelling are summarised below in **Table 3** and **Table 4** while the Sidra Intersection movement summary tables are provided in **Attachment D**. It is noted that the 'all vehicles' case has been used for the summary table for the Union Street / Parkway Avenue signals while for the Parkway Avenue / Corlette Street stop controlled intersection the worst average delay and worst level of service are recorded.

Table 3 – Sidra summary results –Union Street / Parkway Avenue signals

Scenario	Deg. Satn	Ave. delay (s)	LoS	95 % back of queue (cars)
2021 AM – no development	0.886	35.8	C	11.5
2021 AM + Stage 1 development	0.931	54.3	D	19.9
2021 AM + development	0.920	54.1	D	20.1
2031 AM – no development	0.929	55.5	D	22.9
2031 AM + development	1.038	82.6	F	32.9
2021 PM – no development	0.787	30.4	C	7.2
2021 PM + Stage 1 development	0.904	49.9	D	13.5
2021 PM + development	1.040	75.1	F	21.5
2031 PM – no development	0.884	42.0	C	12.1
2031 PM + development	1.132	110.9	F	30.7

Table 4 – Sidra worst movement summary results – Parkway Avenue / Corlette Street stop intersection

Scenario	Movement	Worst Ave. delay (s)	Worst LoS	95 % back of queue (cars)
2021 AM – no development	right out Corlette St south	14.6	B	0.4
2021 AM + development	right out Corlette St south	16.6	B	1.0
2031 AM – no development	right out Corlette St south	16.5	B	0.5
2031 AM + development	through Corlette St south	21.0	B	1.7
2021 PM – no development	right out Corlette St south	14.4	A	0.3
2021 PM + development	right out Corlette St south	16.0	B	0.5
2031 PM – no development	right out Corlette St south	16.3	B	0.4
2031 PM + development	right out Corlette St south	18.2	B	0.6

The modelling shows that the impact of the increased traffic from the school on the Union Street / Parkway Avenue intersection is to increase average delays by between 19 and 40 seconds and queue lengths by an average of 9 to 14 vehicles during these periods. This is not a major increase in delay or queuing on major metropolitan sub-arterial routes therefore despite deteriorating LoS is not unusual on major transport arteries in metropolitan areas. It is noted that the Stage 1 development will not result in the intersection failing. By 2031 with additional background traffic growth the intersection though under more stress is still not operating with large delays or queues that are not considered unacceptable on a major sub-arterial road in a major metropolitan area. There would be many other intersections in the Newcastle area operating with similar or worse traffic conditions now in peak hour periods let alone in 2031. On that basis it is considered the development does not adversely or unacceptably impact on the operation of the intersection. It should be remembered the school traffic peaks at worse only occur for a 20 minute to 30 minute period during the peak hour periods.

The modelling also shows the Parkway Avenue / Corlette Street stop intersection will continue to operate satisfactorily with the proposed development through to 2031 and beyond in both the AM and PM peaks. Average delays and back of queue lengths remain within the thresholds set by TfNSW for satisfactory intersection performance. Therefore it is reasonable to conclude that the proposed development will not adversely impact on the operation of this intersection and therefore as the traffic gets further distributed and diluted through the network intersections on the wider road network.

The modelling results show that the operation of both the Union Street / Parkway Avenue and Parkway Avenue / Corlette Street intersections will not result in queuing at the proposed kiss and ride entrance.

Table 4.2
Level of service criteria for intersections

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode

Source: - RTA's Guide to Traffic Generating Developments (2002)

11.0 ON-SITE CAR PARKING

On-site car parking provision needs to be in accordance with *AS2890.1 – 2004 Parking facilities – Part 1 Off street car parking* and *Newcastle City Council's DCP (2012) Section 7.03 Traffic, Parking and Access*.

The relevant section within the Newcastle DCP provides the following advice for *schools* noting as a primary school this school has no senior students;

Car Parking

- 1 space per 2 staff; and
- 1 space per 100 students for visitors

Bicycle Parking

- 1 space per 10 staff (Class 2)
- 1 space per 10 students (Class 3)

Motor Bike Parking

- 1 space per 20 car spaces.

Note: Council may vary the parking standard depending on location and will require the provision of additional parking where a school auditorium is proposed. Council may require preparation of a Traffic Impact Study to support the proposal.

Council has previously approved the school for up to 256 students and 35 staff with no on-site car parks. Therefore the school already has an historically parking deficiency calculated as follows'

Historical car parking deficiency = $35/2 + 256/100 = 17.5 + 2.56 = \text{say } 20 \text{ car spaces}$.

Based on the projected staff and student numbers the car, bicycle and motorbike parking requirements for the development under the DCP are as follows.

Masterplan

Car parking required = $60/2 + 640/100 = 30 + 6.4 =$ **say 36.4 car parks.**

Bicycle parking = $60/10 + 640/10 = 6$ (secure) + 64 (racks only) = **70 bicycle spaces.**

Motor bike parking = 1 space per 20 car parks = $36.4 / 20 =$ **say 2 motorcycle spaces.**

Stage 1

Car parking required = $50/2 + 480/100 = 25 + 4.8 =$ **say 29.8 car parks.**

Bicycle parking = $60/10 + 640/10 = 5$ (secure) + 48 (racks only) = **53 bicycle spaces.**

Motor bike parking = 1 space per 20 car parks = $30 / 20 =$ **say 2 motorcycle space.**

In relation to Stage 1, an additional say 10 car spaces are required to be provided. While no additional traditional car spaces are being provided as part of the Stage 1 works, the kiss and ride facility has capacity for 7 cars to drop off children at any time, and further standby capacity. This results in at least 10 car queue spaces. It is noted that the ability for this kiss and ride facility to quickly and effectively manage parent parking results in an optimised parking management strategy, eliminating the need for parents to permanently park and leave their vehicles, and thereby eliminates the associated on street car parking demand.

The temporary additional short fall resulting during Stage 1 would be offset by the parking and traffic benefits resulting from the kiss and ride facility. In the context of the existing on street car parking demand from commuters and residents, it is unlikely that any significant impacts would result from this temporary shortfall. It is understood the final staff and visitor car park is being provided within a later stage of the development and provides a total of 37 car spaces, including 2 accessible spaces. This car park will provide sufficient on-site car parking to meet the requirements of Newcastle Council's DCP. The Stage 1 works include secure bicycle racks located at the Parkway Avenue entrance, as detailed on the Architectural plans. The total number of bicycle racks will be finalised through the development of the design to meet the requirements of Newcastle Council's DCP. Whilst motorbike parking is not currently detailed on the plans there is sufficient room on site to provide suitable facilities to meet the DCP requirements and these can be conditioned on any consent issued for the development. For Stage 1 of the development the additional parking demand is to be accommodated on-street within available nearby parking but this is only a temporary measure until the car park in Stage 2 is constructed.

Being a school it is considered there is scope to strongly encourage and implement the Green Travel Plan, to encourage staff and families to encourage a reduced number of vehicle trips for travel to and from the site.

The school continue a strong emphasis on active travel plans for students, to encourage the use of buses as well as walking and cycling to school. In this respect initiatives to encourage car-pooling, bicycle and foot travel as well as public transport could be implemented and managed by the school principal or a nominated representative. Reducing the number of light vehicle trips for travel to and from the school would reduce the overall peak parking demand generated by the school. To this end a draft Green Travel Plan has been prepared and is included as Attachment A of this report.

The site is within close proximity to the city centre, and the expansion of the school will ensure that the ongoing urban consolidation of the surrounding areas is supported by adequate educational infrastructure. The site is within an easy walking or cycling distance from the growing precincts of Newcastle, along with a high connectivity with public transport options. This will encourage non-car transport use as the city's population increases.

Noting the growing population in the city centre, and the need to cater for this growth, the master plan for the site has balanced that on-site parking and the need to ensure appropriate educational or sporting / recreational facilities. As noted, the relocation of Year 5 and 6 from The Hill Campus to the Park Campus is part of the need to continue to meet the demands of the constraints of existing inner city areas.

The car parking is required to be compliant with Australian Standard *AS2890.1-2004 Parking facilities – Part 1 Off-street car parking*. In assessing compliance it is noted the staff car parking would be Class1A parking and the visitor spaces Class 2 parking. The relevant standards for the car park assessment are, therefore.

- Class 1A parking – minimum 2.4 metres wide by 5.4 metres long (30 required).
- Class 2 parking – minimum 2.5 metres wide by 5.4 metres long (minimum 5 required).
- Accessible space – 2.4 metres wide by 5.4 metres long with similarly dimensioned shared zone with bollard beside it (minimum 1 required under AS2890.6-2009).
- Minimum aisle width – 5.8 metres wide;
- As car park is designed as a long blind aisle a turning bay is required at the end of the blind aisle.
- 1 metre wide blind aisle extension also required at the end of the blind aisle.

Whilst the current concept plans are not currently suitably detailed or dimensioned for a rigorous assessment for compliance with Australian Standard requirements by scaling it appears the car park could be constructed to Australian Standards requirements without the loss of a car park. Therefore the requirement for compliance with Australian Standards could also be conditioned on any consent issued for the development with confirmation required before the issue of a Construction Certificate.

It is noted the extensions to the school will not change the servicing arrangements for the school, which are currently all undertaken off-site.

12.0 VEHICULAR ACCESS

The proposal involves the construction of two new vehicular accesses to the site at Corlette Street (entry only) and Union Street (exit only) to service the proposed kiss and ride facility (7 spaces) and the proposed car park (37 spaces including 2 accessible spaces). Note at the Union Street exit all movements will be restricted to left out only to improve road safety at the exit and minimise queuing within the kiss and ride. In accordance with Australian Standard *AS2890.1-2004 Parking facilities – Part 1 Off-street car parking* a car park with between 25 and 100 spaces serviced from local roads is required to have a minimum Category 2 access. A category 2 access is a combined entry / exit 6 to 9 metres wide. The proposed access arrangement provides separate entry and exits connected to a one way flow internal road therefore is considered a Category 3 access as described in the Australian Standard. It therefore exceeds the Australian Standards requirements described in Tables 3.1 and 3.2 of the standard.

Approach sight distance (ASD) at the entry and safe intersection sight distance (SISD) at the Union Street exit exceed the requirements of Australian Standards and Austroads with available sight distance being observed to be in excess of 150 metres. The Australian Standard for SISD for a 40 km/h speed frontage is 55 metres or 83 metres for a 60 km/h speed frontage. Austroads requires an ASD of 40 metres for a 40 km/h speed frontage and an SISD of 73 metres for a 40 km/h speed zoning and 123 metres for a 60 km/h speed zoning. Sightlines for drivers exiting the Kiss and Drop should be sufficient provided cars park sufficiently far away from the crossover as required by law. It is recommended that where parked cars become an issue, that suitable line marking and / or signposting is installed through Council's Traffic Committee, to ensure cars park a suitable distance from the exit.

As a one way internal road servicing the kiss and ride facility and the on-site car park this road under Australian Standards is required to be a minimum 3 metres wide. The proposal complies with this requirement. Use of the kiss and ride facility may result in some queuing back onto Corlette Street particularly during the afternoon pick up period. To mitigate these impacts a traffic management plan has been developed (see **Attachment E**) for the kiss and ride which seeks to educate parents on the use of the kiss and ride and detail the levels of enforcement to be undertaken by the school in marshalling the facility during the afternoon pick up period.

The provision of the new accesses will result in the loss of 2 on-street car parks in both Union Street and Corlette Street. This is however compensated by the fact that the development will on completion comply with Council's DCP parking requirements and eradicate a 20 space historical car parking deficiency in the current school. Therefore theoretically on completion of the development there will be an additional 16 on-street car parks available during school hours in Corlette Street and Union Street.

The kiss and ride lane were included in the Network Sidra Intersection model developed for this project and the results of the modelling for the entry and exit lanes are provided in **Table 5** below.

Table 5 – Sidra summary results –Kiss and Ride entry and exit intersections

Scenario	Deg. Satn	Ave. delay (s)	Worst LoS	95 % back of queue (cars)
2021 AM - entry	0.290	8.8	A	0.1
2021 AM - exit	0.267	6.7	A	0.2
2031 AM – entry	0.311	7.9	A	0.1
2031 AM - exit	0.305	7.0	A	2.4
2021 PM – entry	0.222	7.7	A	0
2021 PM - exit	0.333	7.2	A	0.3
2031 PM – entry	0.258	8.2	A	0.1
2031 PM - exit	0.354	7.8	A	4.3

This modelling shows that the kiss and road connections to the public road network would operate satisfactorily during both the AM and PM peak periods subject to rational behaviour by parents picking up their children.

Overall it is concluded the proposed access arrangements to the kiss and ride facility and on-site car park are compliant with Australian Standard and Newcastle City Council requirements therefore is suitable for use by the development.

13.0 CONSTRUCTION TRAFFIC

The construction of the buildings will be undertaken in two stages with the new Union Street building being constructed in the first stage. A construction access to the site will be installed at the location of the kiss and ride entry access off Corlette Street to allow limited construction employees driving utes with tools and products in the tray to enter the site as well as smaller deliveries and waste collection vehicles. Approval will be sought in Stage 1 for a construction zone with reduced speed limits during daylight hours on the eastern side of Union Street along the school frontage. This will require the temporary relocation of a bus stop 70 metres further north along Union Street and will be subject to Newcastle City Council Traffic Committee approval. The construction zone will allow larger deliveries to park along this kerb for unloading. Traffic marshals will be employed to direct pedestrian traffic through or around the construction zone during construction with pedestrians protected with jersey kerb barriers where necessary and pedestrian paths delineated with hi-vis bunting. During Stage 2 construction works approval will be sought to relocate the construction zone to the Corlette Street frontage of the site if required. No construction access is proposed to be provided off Union Street.

As requested by Newcastle City Council all construction employees not requiring to carry tools or product to the site will be directed to park in the northern end of the Bar Beach public car park in Memorial Drive and they will be transported to the site via a shuttle service using company utilities or other appropriate vehicles. It is also noted that where possible major construction works on the site will be programmed for either the 7 week end of year school break (December – January) or

the 3 week mid-year school break (June – July) to minimise the impact of the construction on school activities.

It would be expected that up to 30 tradesman / construction employees would be on-site at anyone time which is likely to represent a traffic generation of approximately 20 to 25 vph at the start and finish of work. Deliveries and waste removals during the day would not be expected to exceed 10 vph even during major concrete pours. The worst case construction traffic scenario would be an early morning concrete pour when along with concrete pumping services a peak construction traffic generation of up to 35 vph would be expected. This is less than the additional traffic generated by the Stage 1 extensions therefore as this assessment has concluded that the Stage 1 extensions do not adversely impact on the local road network then it would be reasonable to conclude that the proposed construction works would also not adversely impact on the local road network.

Construction traffic is a short term loading usually lasting less than 6 months and is best mitigated through the preparation and implementation of a Construction Traffic and Pedestrian Management Plan. This document identifies strategies to reduce the impact of the construction works not only on the local road network but also on the operation and amenity of the school and nearby residents. A concept Construction Traffic and Pedestrian Management Plan has been prepared and is provided in **Attachment G**. It would be expected the finalisation of this plan prior to construction commencing would be conditioned on any consent issued for the development by the building contractor engaged to undertake the construction works.

14.0 PEDESTRIAN AND CYCLE FACILITIES

The proposed development would generate additional pedestrian traffic however the existing concrete and asphalt footpath network, with crossing facilities, which already exists within the area, is considered suitable for the level of additional pedestrian traffic resulting from this development. Therefore, no nexus exists for additional pedestrian facilities in the area. The development will also generate some additional cycle traffic particularly with the improved end of trip facilities provided at the school though the level of increase would not be sufficient such that a nexus exists for the provision of additional cycle ways in the vicinity of the site.

15.0 PUBLIC TRANSPORT FACILITIES

The proposed development may generate an increase in patronage of the existing public transport system servicing the site. The site is already serviced by public transport with bus routes and bus stops being within convenient walking distance of the site. Further school bus services are likely to be improved and increased with additional students at the school. There is however opportunity within this development for the school to encourage public transport use among staff and students, particularly through the School Student Transport Scheme which provides free or subsidised public transport for travel to and from school, to reduce light vehicle trips to and from the site and the need for some on-site or on-street car parking. This can be undertaken through the preparation of a Green Travel Plan for the school and a concept plan has been provided in **Attachment B**.

Currently all school bus services utilise a bus set down bay along the school frontage in Parkway Avenue between Union Street and Corlette Street for the dropping off and pick up of school students. This provides convenient access to the school grounds for students and allows the buses to use the Union Street / Parkway Avenue signalised intersection for safe and convenient turning movements into the set down area. The school bus bay will not be impacted by the construction works and will be able to be continuously used during construction. The public bus stop on the eastern side of Union Street along the school frontage site may need to be temporarily relocated 70 metres north during construction works to allow a construction zone to be installed on

Union Street along the school frontage during construction. This will however be subject to the approval of Newcastle City Council's Traffic Committee.

Note for Stage 1 as most of the increase in student numbers involves students being relocated from The Hill campus and these students are already on the buses as these buses proceed to The Hill campus in the mornings and come from The Hill campus in the afternoon the school is not expecting to provide additional school bus services for Stage 1. The existing school bus zone is satisfactory in terms of length based on the current frequency and timing of the bus services with no queueing occurring back onto Union Street. Therefore there is no need to review or modify the existing school bus zones on Parkway Avenue. This will be further reviewed on submission of DA's for the Stage 2 school expansion works.

However, overall, it is reasonable to conclude that the existing public transport services and infrastructure in the vicinity of the site is suitable for the development and changes to the existing public transport system or additional infrastructure are not required.

16.0 CONCLUSIONS

This traffic and parking assessment for the proposed masterplan and stage 1 construction works for the future development of Newcastle Grammar School – Park Campus at 127 Union Street, Cooks Hill has determined the following;

- The existing road network around the site is currently operating satisfactorily with good levels of service for motorists.
- The proposed full development of the site to a 4 stream school catering for Kindergarten to Year 6 students is likely to generate an additional 364 vtpm during the AM peak and 303 vtpm during the PM peak while the Stage 1 works for which approval is also sought generates 269 vtpm in the AM peak and 224 vtpm in the PM peak.
- The addition of this traffic onto the local road network does not result in the road capacity thresholds for two-way mid-block capacity to be reached or result in an adverse or unacceptable impact on the operation of adjoining intersections. Therefore it can be concluded that the proposed development does not adversely or unacceptably impact on the local road network.
- Sidra Intersection modelling has demonstrated that the development does not unacceptably impact on the operation of the Union Street / Parkway Avenue signals. In particular the intersection continues to operate within the acceptable TfNSW guidelines for satisfactory intersection performance.
- Sidra Intersection modelling has demonstrated that the development does not adversely impact on the Parkway Avenue / Corlette Street stop intersection and therefore as the traffic gets further distributed and diluted through the network intersections on the wider road network.
- The proposal by providing a 37 space on-site car park provides sufficient and suitable on-site car parking to meet the requirements of Newcastle City Council's DCP (2012) and Australian Standard AS2890.1-2004 *Parking facilities – part 1 Off-street car parking*.
- The extensions to the school do not change the servicing arrangements for the school which are all currently undertaken off-site.
- The proposed access arrangements to the kiss and ride facility and on-site car park are compliant with Australian Standard and Newcastle City Council requirements therefore is suitable for use by the development however they will need the approval of Newcastle City Council. Sidra modelling has demonstrated that these accesses would operate satisfactorily subject to rational behaviour by parents collecting their children of an afternoon.
- A Construction Traffic and Pedestrian Management Plan will need to be implemented during construction works to mitigate adverse impacts of construction traffic on the local road network and in regard to the operation and amenity of the school and nearby residents. Strategies to mitigate the impacts for which prior approval is required include the

use of remote parking for non-essential vehicles off-site, provision of a Construction Zone on Union or Corlette Street along the school frontage during different stages of construction, marshalling and protection of pedestrian movements through the construction zone and programming of as much of the construction works during the extended school break periods as possible. Overall however it is reasonable to conclude that with the implementation of the Construction Traffic and Pedestrian Management Plan the construction works will not adversely impact on the local road network, the school or nearby residents.

- The existing concrete footpath network, with crossing facilities, which already exists within the area, is considered suitable for the level of additional pedestrian traffic resulting from this development and no nexus exists for additional pedestrian facilities in the area.
- The development is unlikely to generate any significant increase in cycle traffic even with the proposed improved end of trip facilities for cyclists. Therefore no nexus exists for the provision of additional cycle ways in the vicinity of the site.
- The existing public transport services and infrastructure in the vicinity of the site is suitable for the development. Changes to the existing public transport system or additional infrastructure are therefore not required however, the school is adopting and implementing a Green Travel Plan to encourage more use of public transport by staff and students.

17.0 RECOMMENDATION

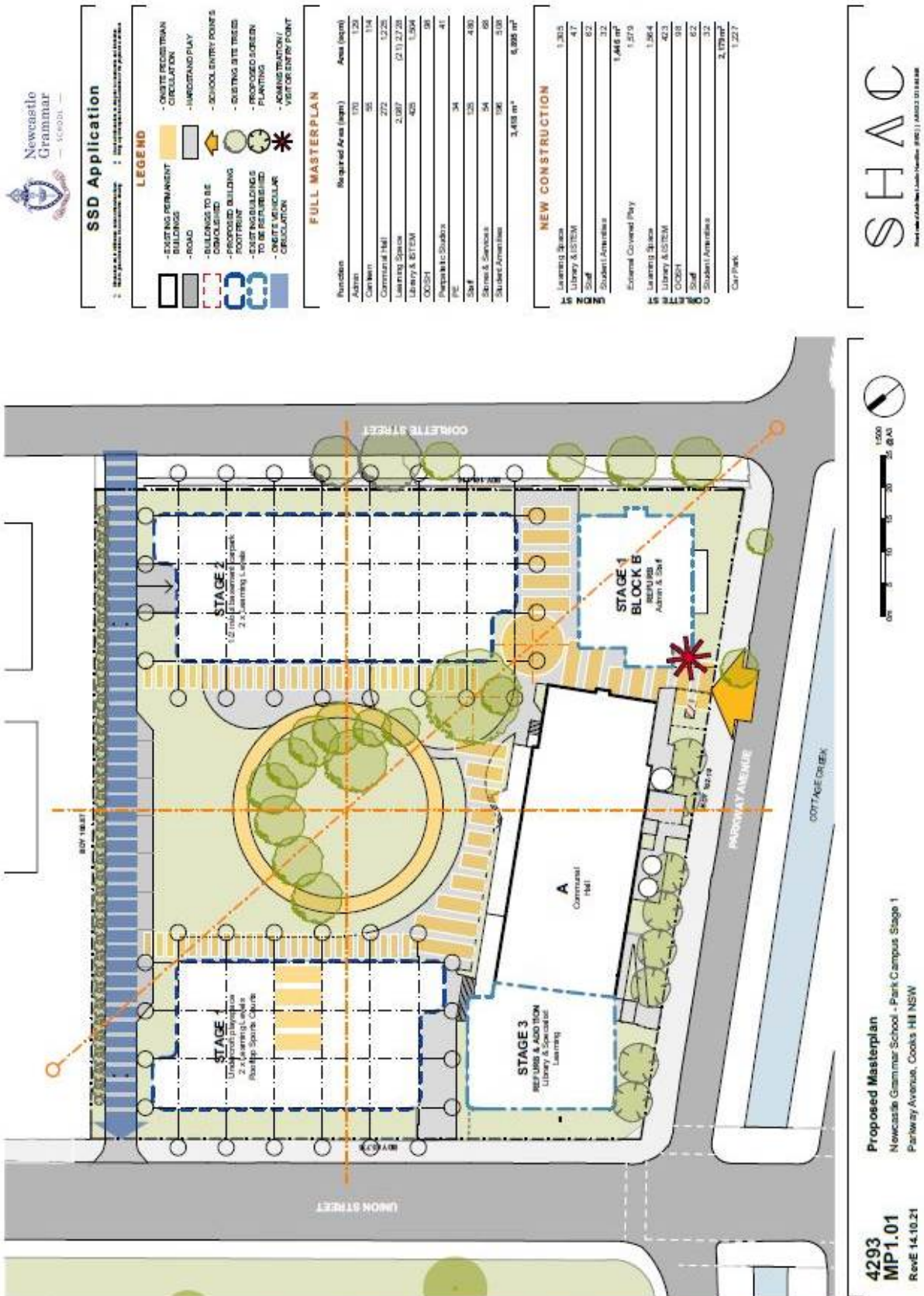
Having carried out this traffic and parking assessment for the proposed masterplan and stage 1 construction works for the future development of Newcastle Grammar School – Park Campus at 127 Union Street, Cooks Hill, it is recommended that the proposal can be supported from a traffic impact perspective as the development complies with all relevant requirements of Newcastle City Council, Australian Standards and TfNSW.

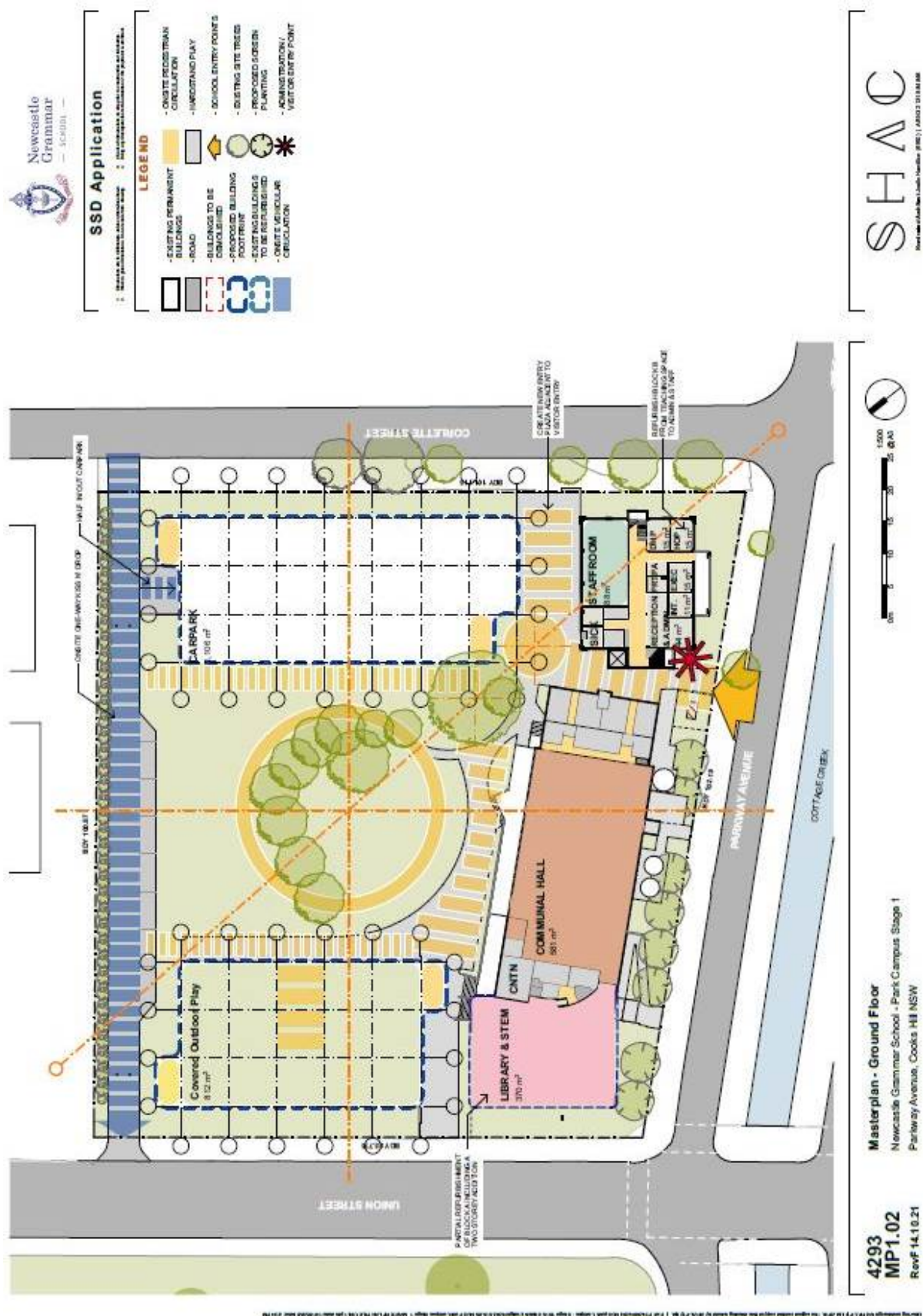


JR Garry BE (Civil), Masters of Traffic
Director
Intersect Traffic Pty Ltd



ATTACHMENT A DEVELOPMENT PLANS





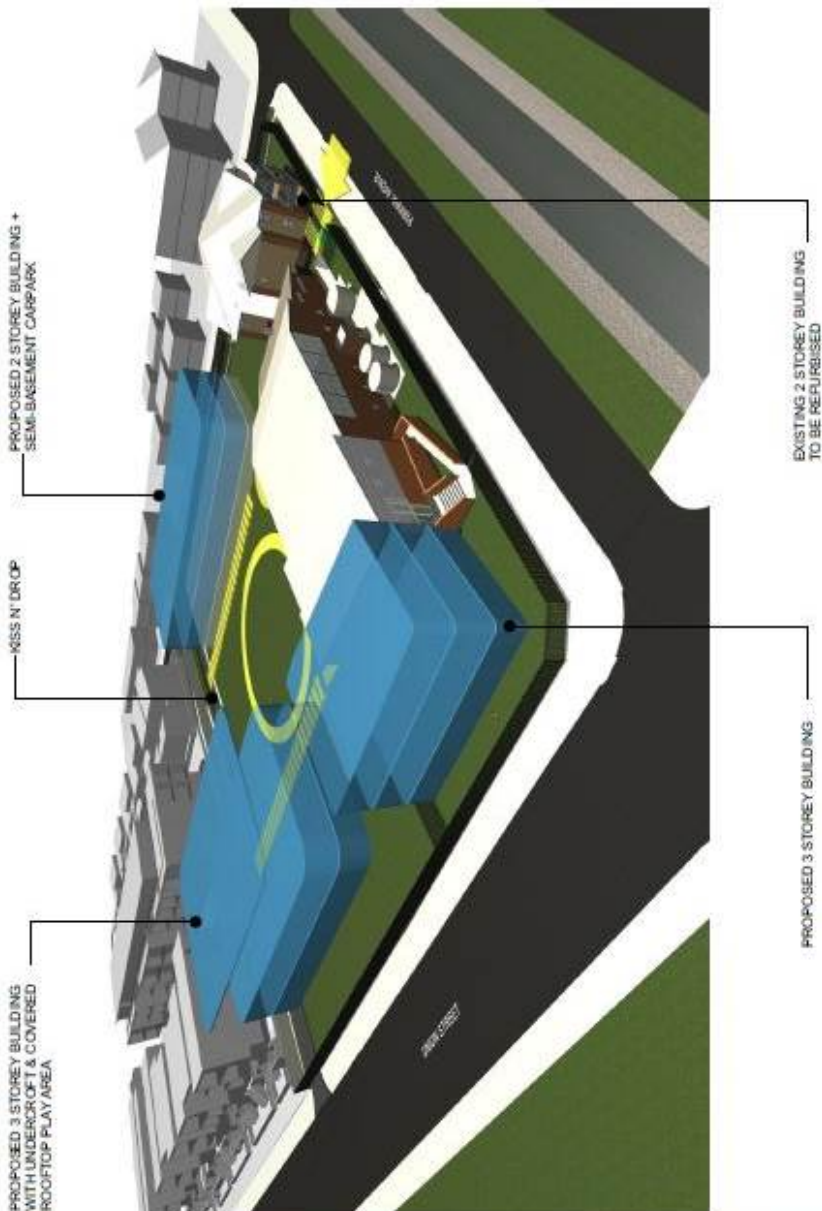






SSD Application

1. School of Architecture, Planning & Landscape
2. School of Architecture, Planning & Landscape
3. School of Architecture, Planning & Landscape



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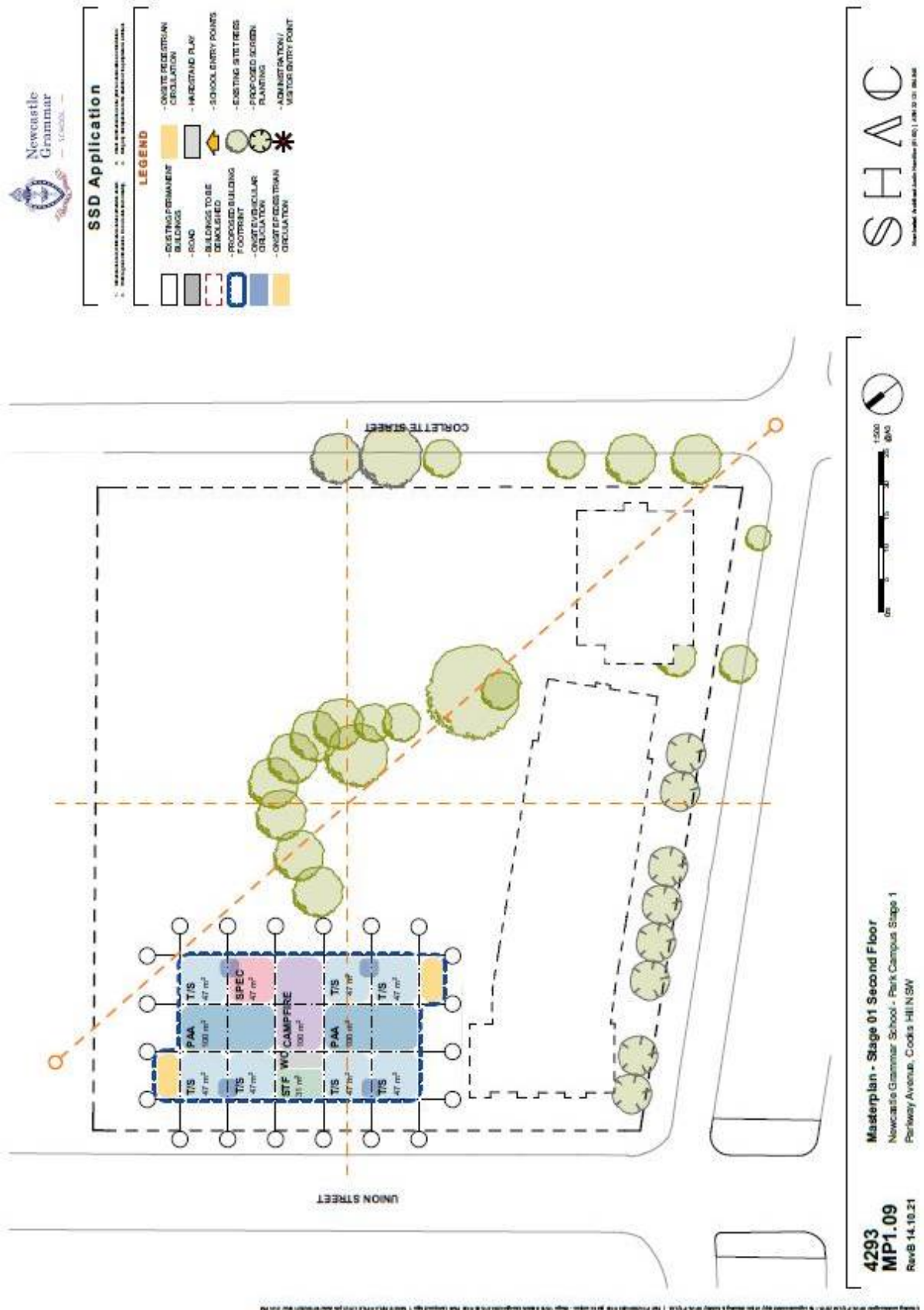
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Masterplan - Blocking & Stacking
Newcastle Grammar School - Park Campus Stage 1
Parkway Avenue, Cooks Hill NSW

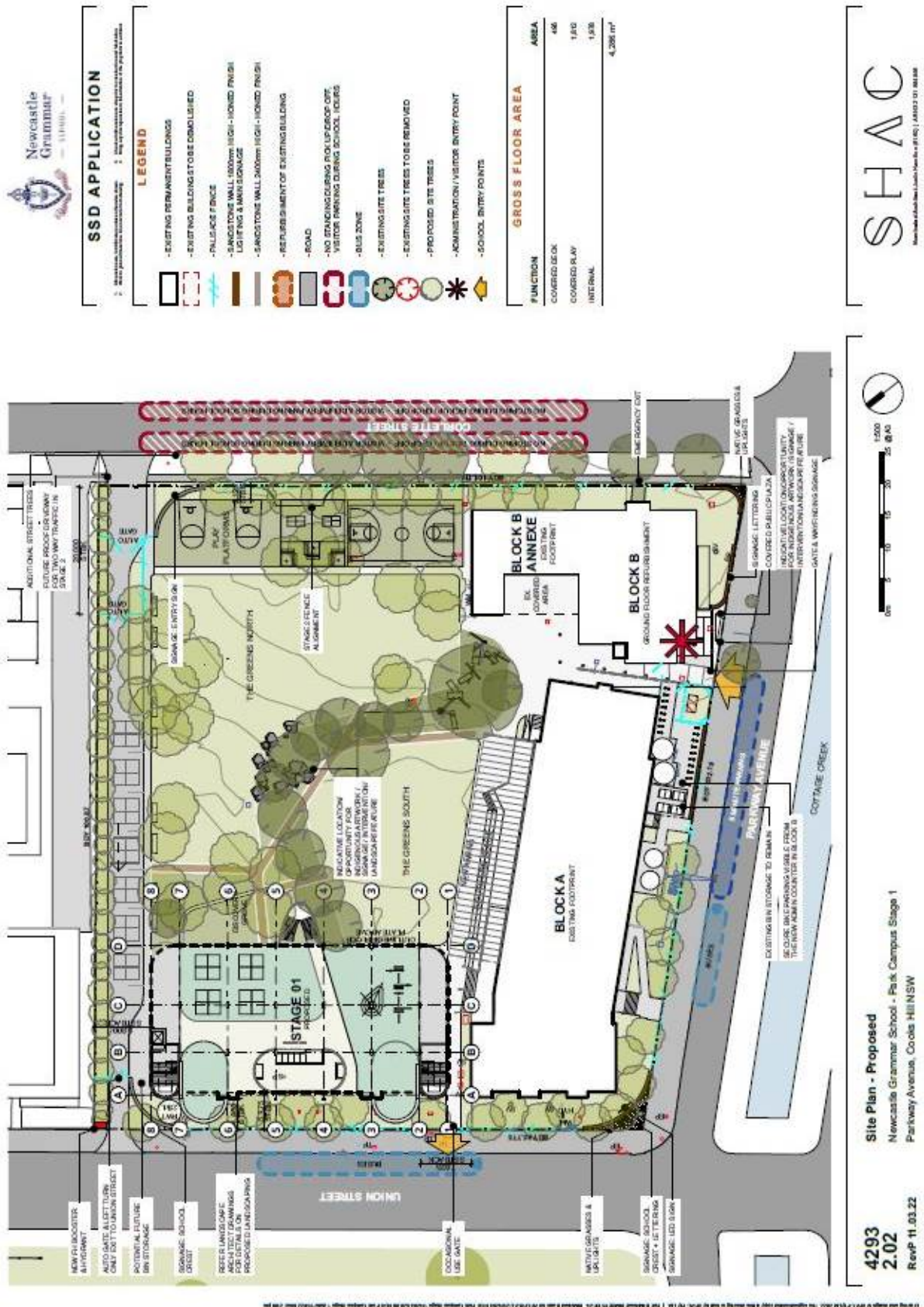
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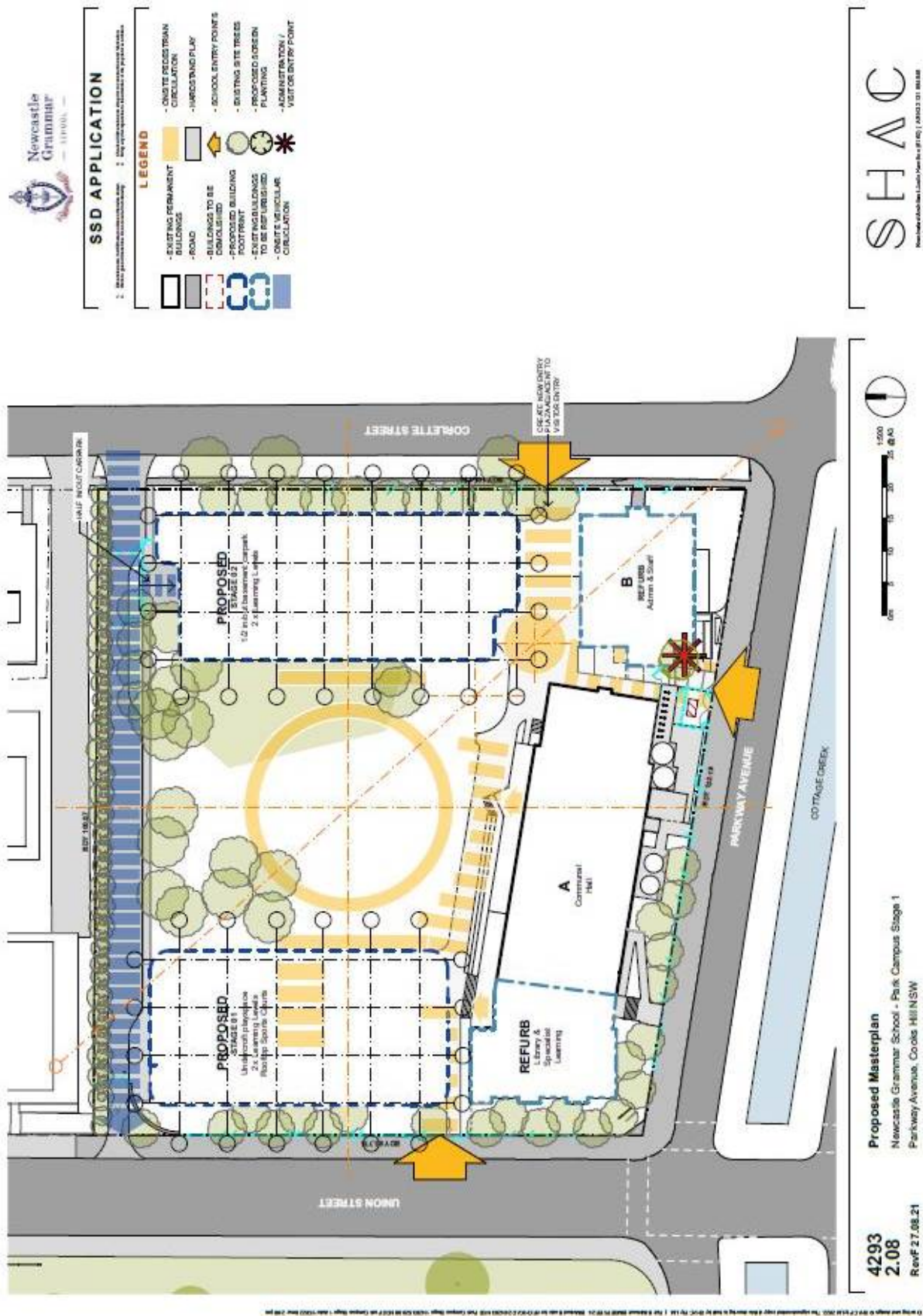


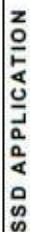








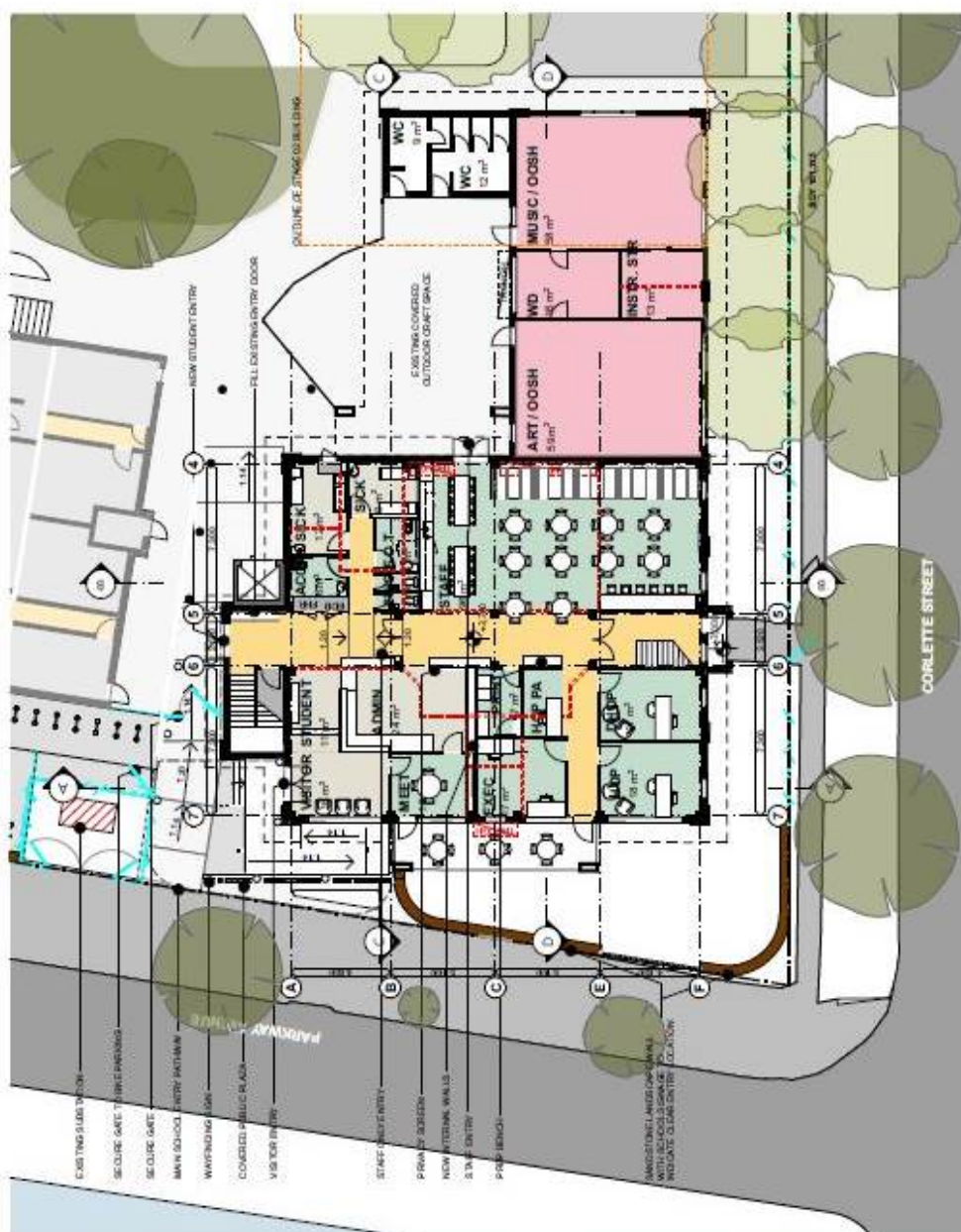




10. The number of people who are not in the labor force is 100 million. The number of people who are in the labor force is 150 million. The number of people who are unemployed is 50 million. The number of people who are employed is 100 million.

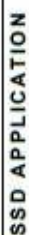


THE CAC



Block B Ground Floor Plan
Newcastle Grammar School - Park Campus Stage 1
Parkway Avenue, Cooks Hill NSW

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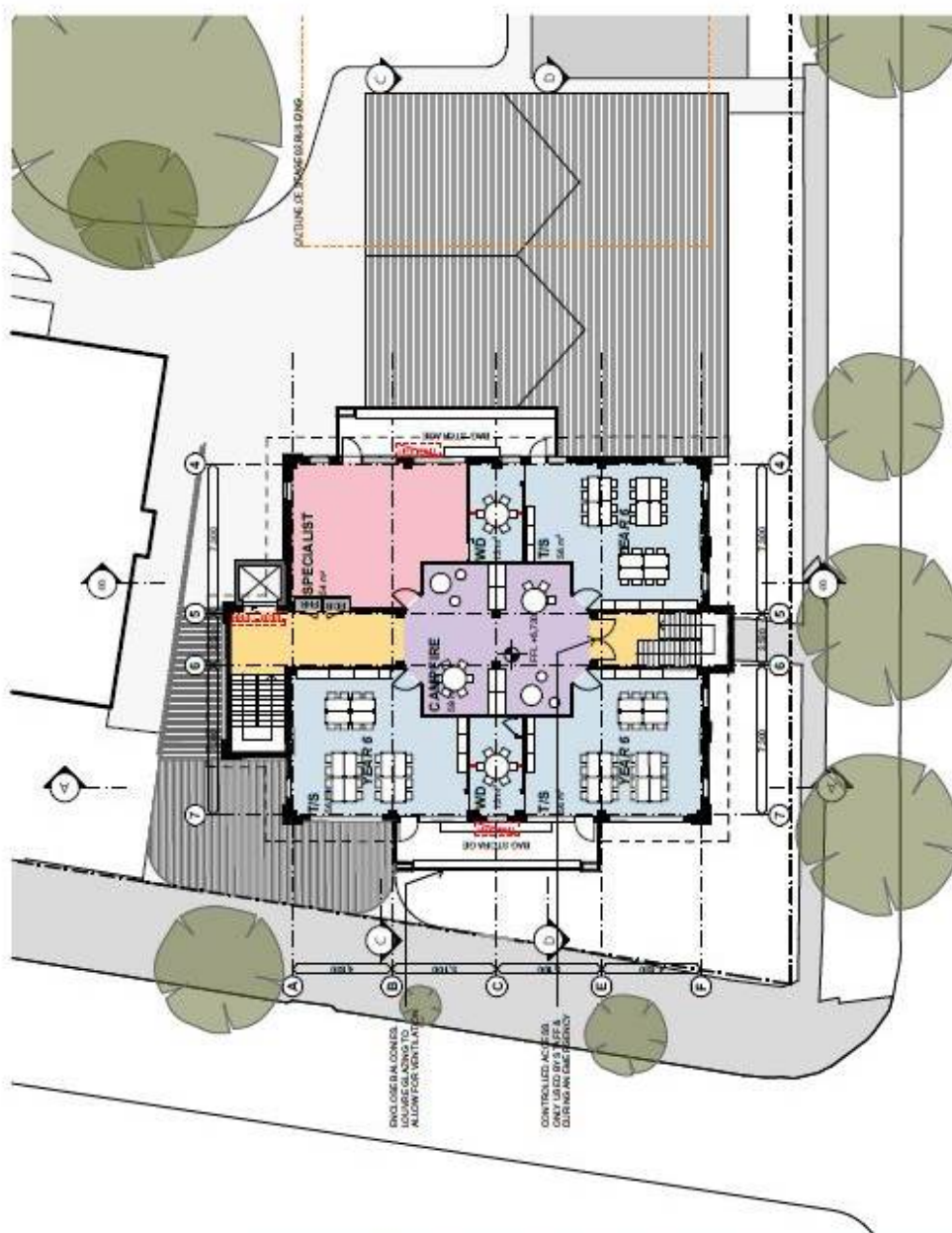


10. *Explain the importance of the following factors in the development of a country's economy:*

- (a) *Human resources*
- (b) *Capital resources*
- (c) *Technology*
- (d) *Government policy*



CHAC



Block B First Floor Plan
Newcastle Grammar School - Park Campus Stage 1
Parkway Avenue, Coos Bay, OR 97331

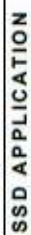
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Block B Elevations - South & East
Newcastle Grammar School - Park Campus Stage 1
Parkway Avenue, Cocks Hill NSW

SHAC





SSD APPLICATION

1. *Identificarea beneficiarilor* este un proces în care se stabilește dacă beneficiarii sunt persoane fizice sau juridice care au nevoie de servicii sociale.

EXTERIOR FINISHES LEGEND

CODE	FINISH
CST01	Clauding Stone Wall - Clean on Green Light to Medium
FSN01	Face - Sand Harvest
FSN02	Face - Zeus Harvest
FSN03	Face - Zeas Timberland
FSN04	Face - Zeas Timberland
FSN05	Face - Zeas Timberland
FSN06	Face - Zeas Timberland
FSN07	Face - Zeas Timberland
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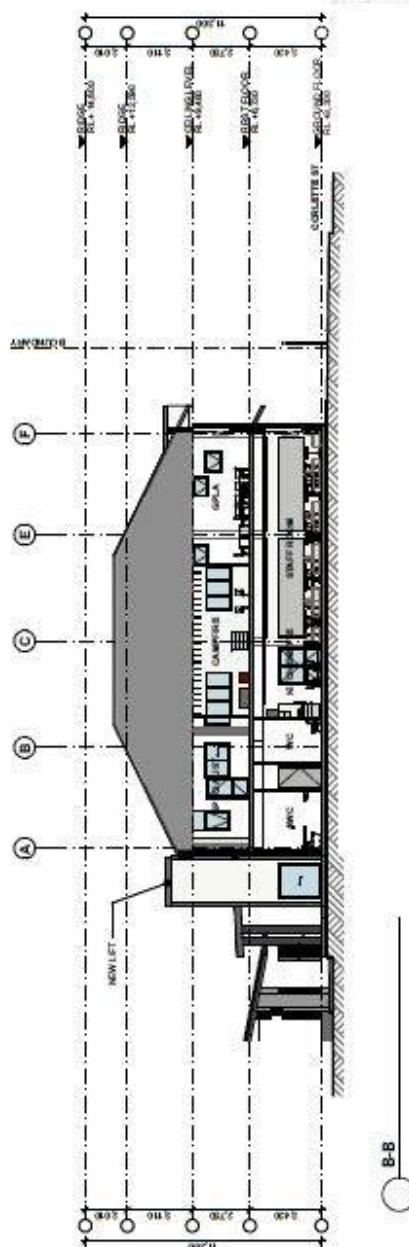
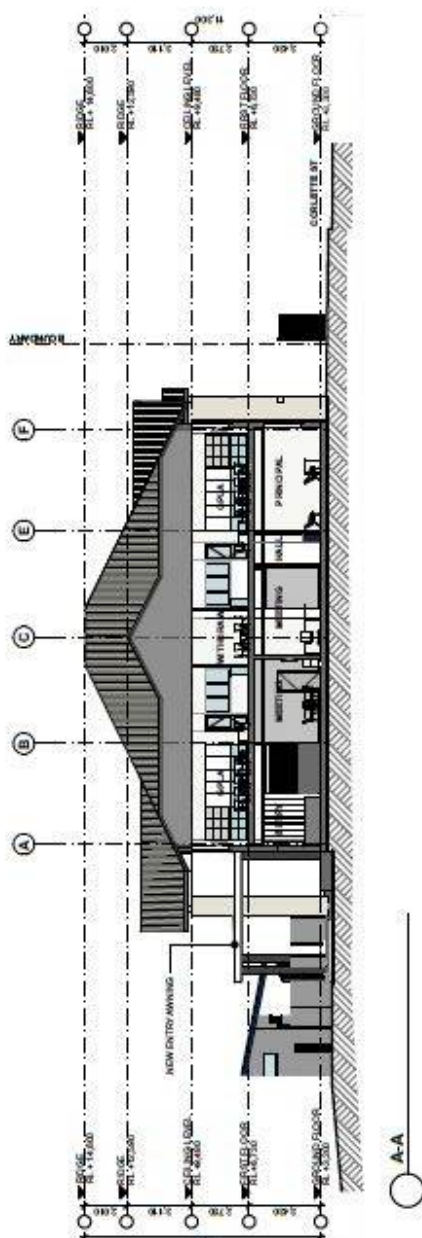
Block B Elevations - North & West
Newcastle Grammar School - Park Campus Stage 1
Parkway Avenue, Coobee Hill NSW

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Age Group	Option A (%)	Option B (%)	Option C (%)	Option D (%)
18-24	~85	~10	~3	~2
25-34	~75	~15	~5	~5
35-44	~65	~20	~10	~5
45-54	~55	~25	~15	~5
55-64	~45	~30	~20	~5
65+	~35	~35	~25	~5



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Block B Sections 01
Newcastle Grammar School - Park Campus Stage 1
Parkway Avenue, Cocks Hill NSW

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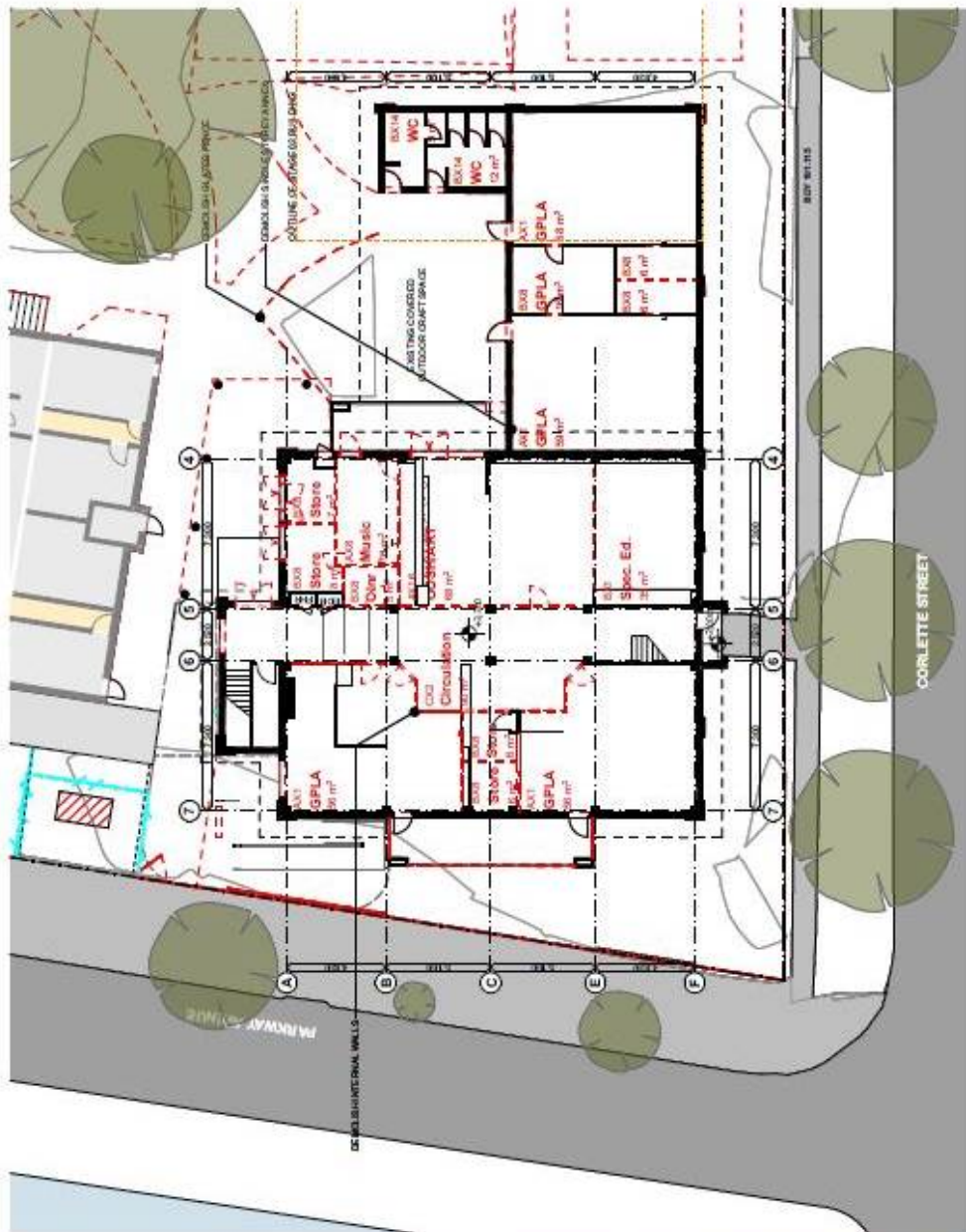


SSD APPLICATION

- 1. The proposed demolition is in accordance with the relevant planning controls.
- 2. The proposed demolition is in accordance with the relevant planning controls.
- 3. The proposed demolition is in accordance with the relevant planning controls.



SHAC
Newcastle Grammar School - Cooks Hill - NSW



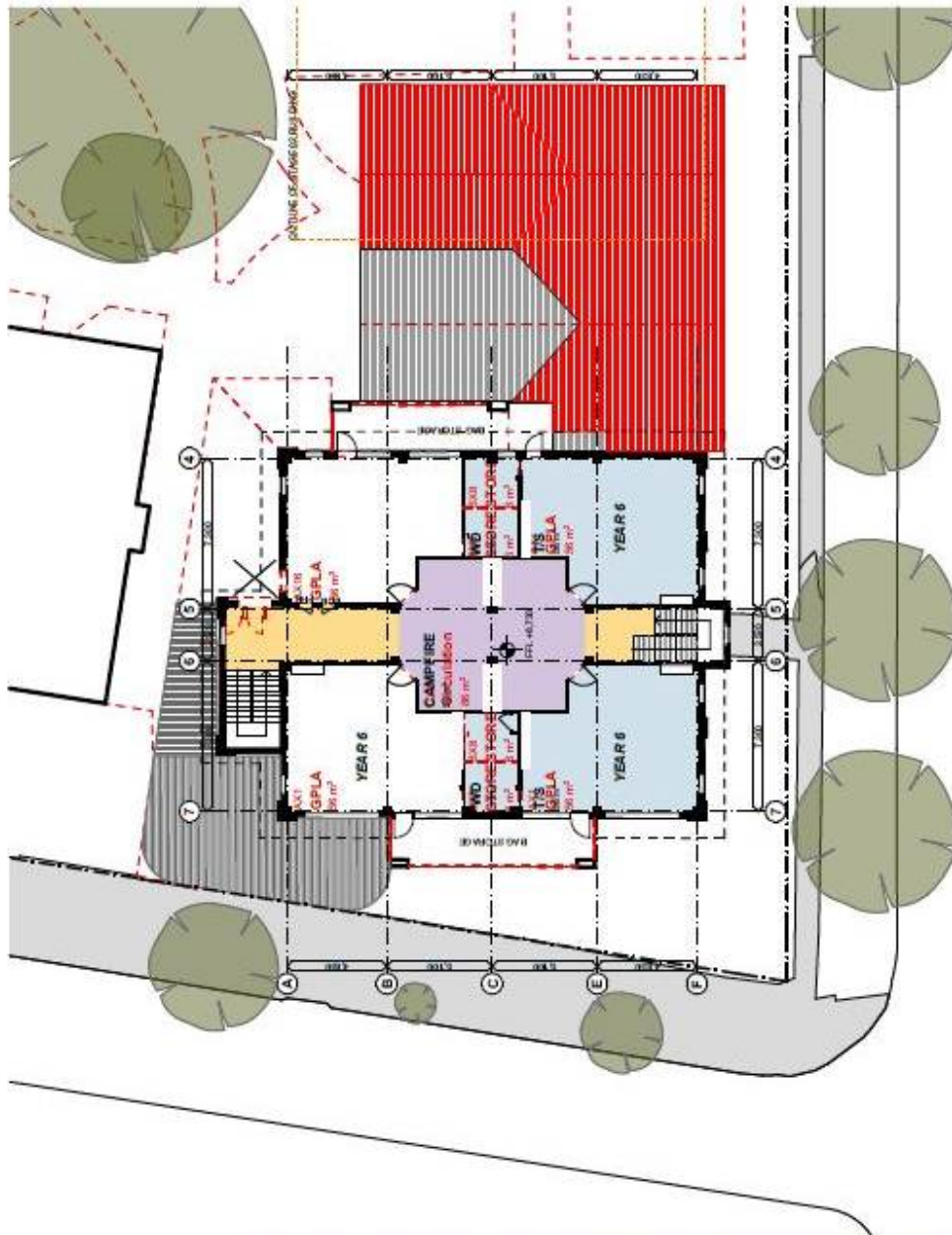


SSD APPLICATION

1. Site plan showing the proposed development
2. Site plan showing the proposed development
3. Site plan showing the proposed development



SHAC
Newcastle Grammar School - Cooks Hill NSW



Demolition Plan - First Floor
Newcastle Grammar School - Park Campus Stage 1
Parkway Avenue, Cooks Hill NSW

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RevA 16.11.20

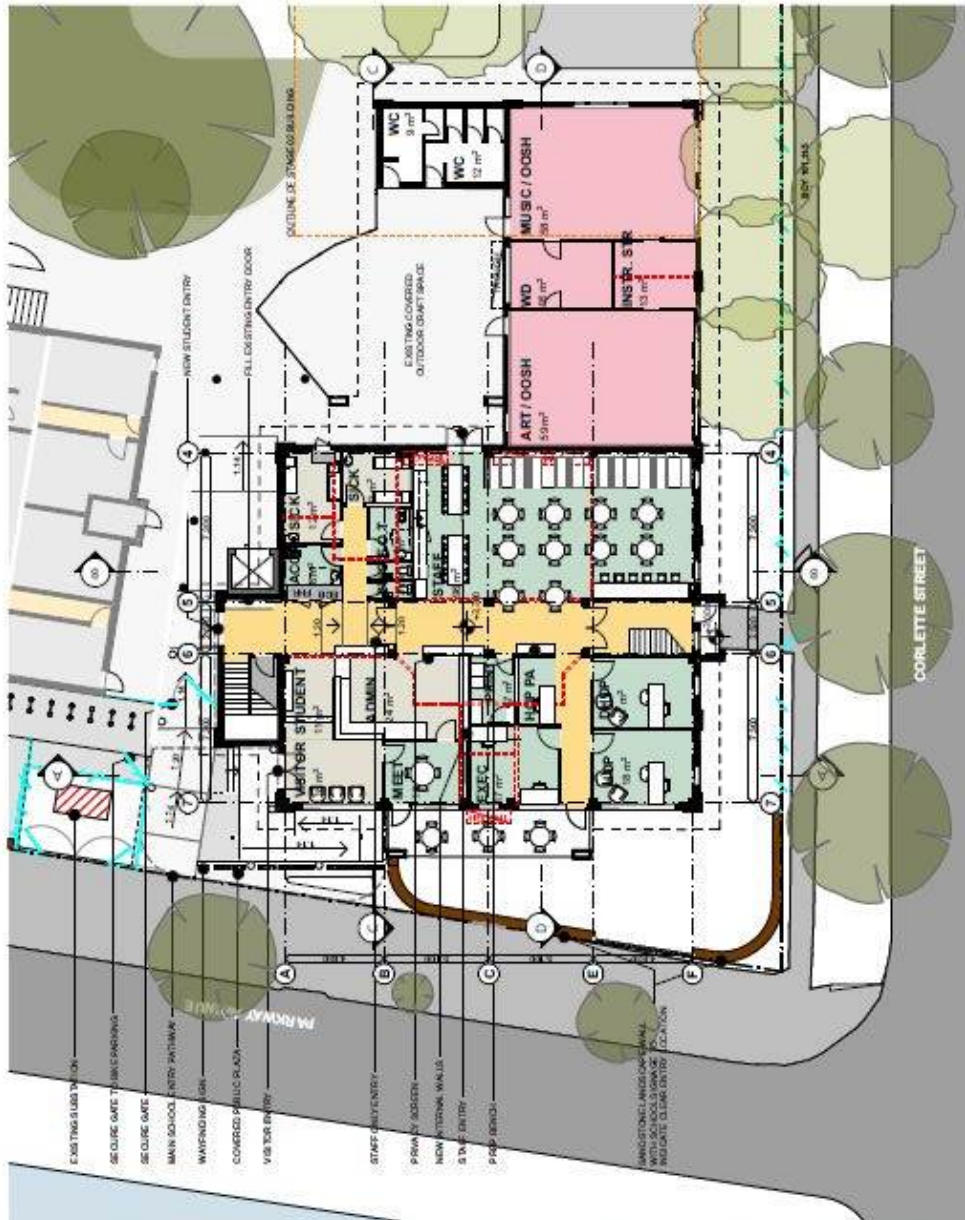


SSD APPLICATION

- 1. School Grounds and Surrounding Area
- 2. Map of the proposed site and surrounding area



SHAC
State Highway Authority of NSW



Stage 02 Ground Floor Plan
Newcastle Grammar School - Park Campus Stage 1
Parkway Avenue, Cooks Hill NSW

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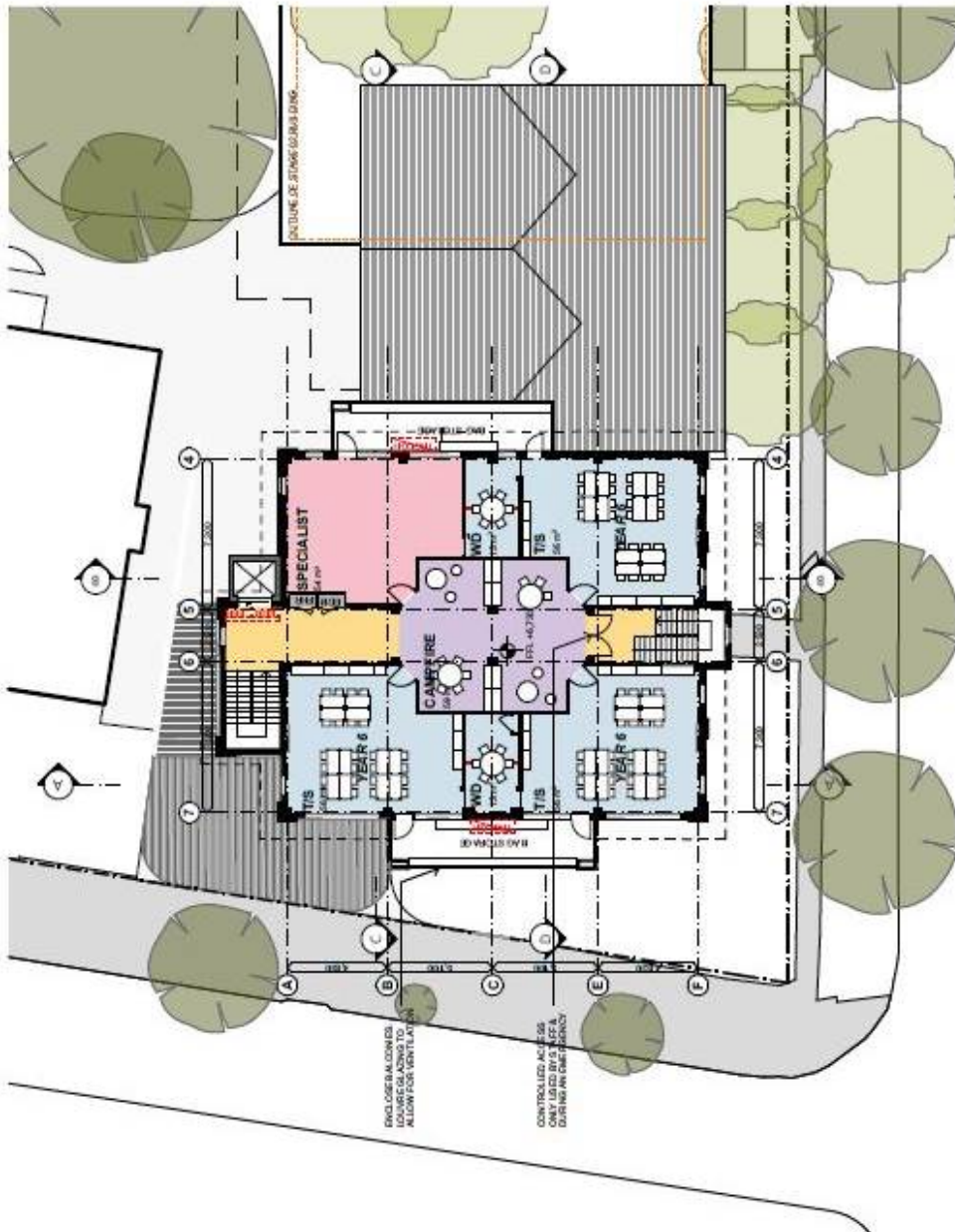


SSD APPLICATION

1. This plan is submitted for the purpose of obtaining a SSD Application for the proposed development.
2. The plan is submitted for the purpose of obtaining a SSD Application for the proposed development.

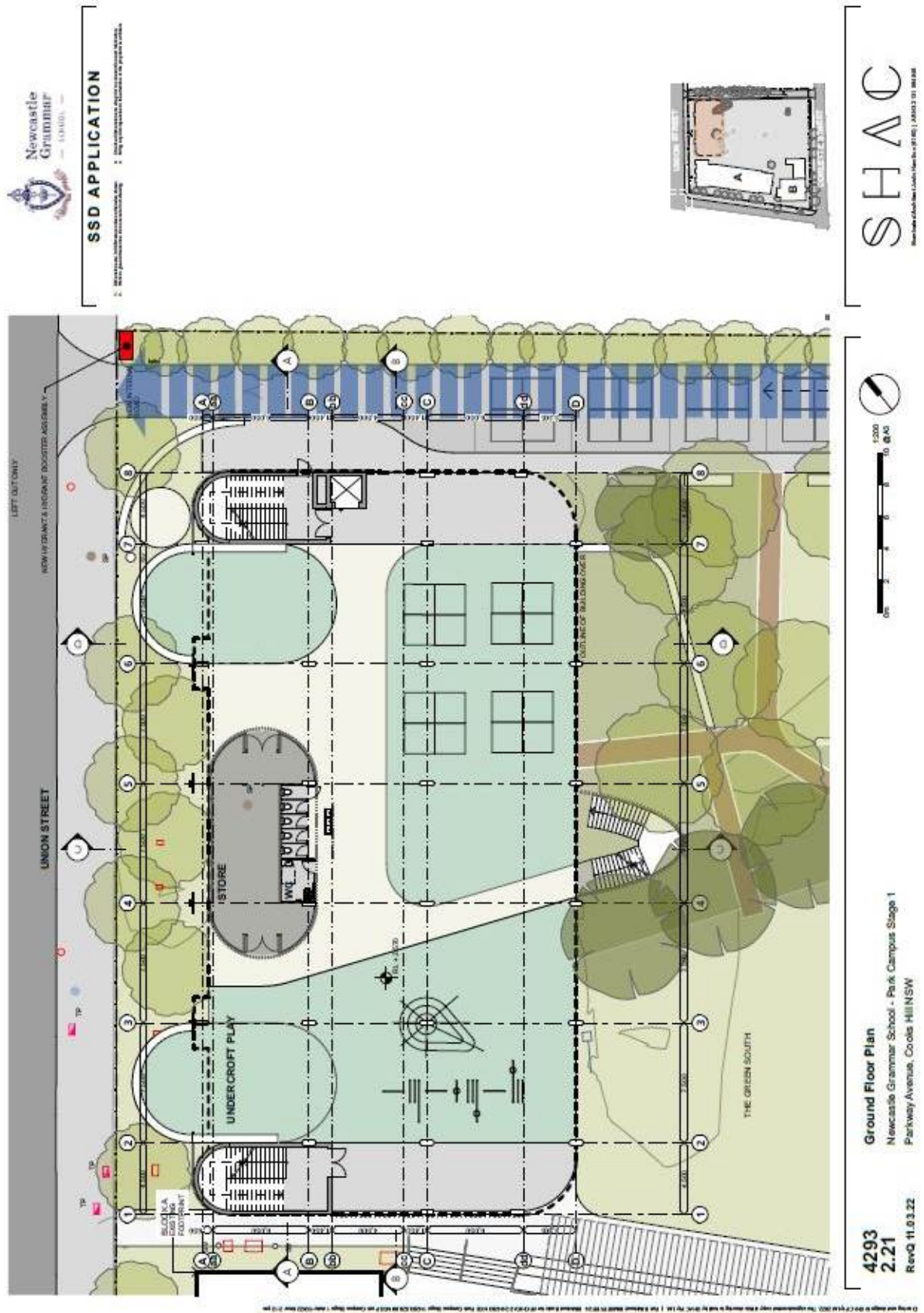


SHAC
State Highway Authority of NSW



Stage 02 First Floor Plan
Newcastle Grammar School - Park Campus Stage 1
Parkway Avenue, Cooks Hill NSW

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RevA 23.03.21





SSD APPLICATION

1. This plan is for the purpose of the SSD application only. It is not to be used for any other purpose.
2. The plan is for the purpose of the SSD application only. It is not to be used for any other purpose.



First Floor Plan
Newcastle Grammar School - Park Campus Stage 1
Parkway Avenue, Cooks Hill NSW

4293
2.22
RevP-15.10.21



SHAC
Shane Hume & Associates Pty Ltd (ABN 61 611 111 111) | 08 9321 031 | 884 888



1. *Gravitation* (1972) *Gravitation and Cosmology* (1979) *General Relativity and Cosmology* (1983) *Gravitation and Cosmology* (1987) *Gravitation and Cosmology* (1991) *Gravitation and Cosmology* (1995) *Gravitation and Cosmology* (1999) *Gravitation and Cosmology* (2003) *Gravitation and Cosmology* (2007) *Gravitation and Cosmology* (2011) *Gravitation and Cosmology* (2015) *Gravitation and Cosmology* (2019) *Gravitation and Cosmology* (2023)



CHAS

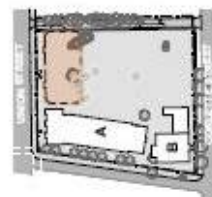
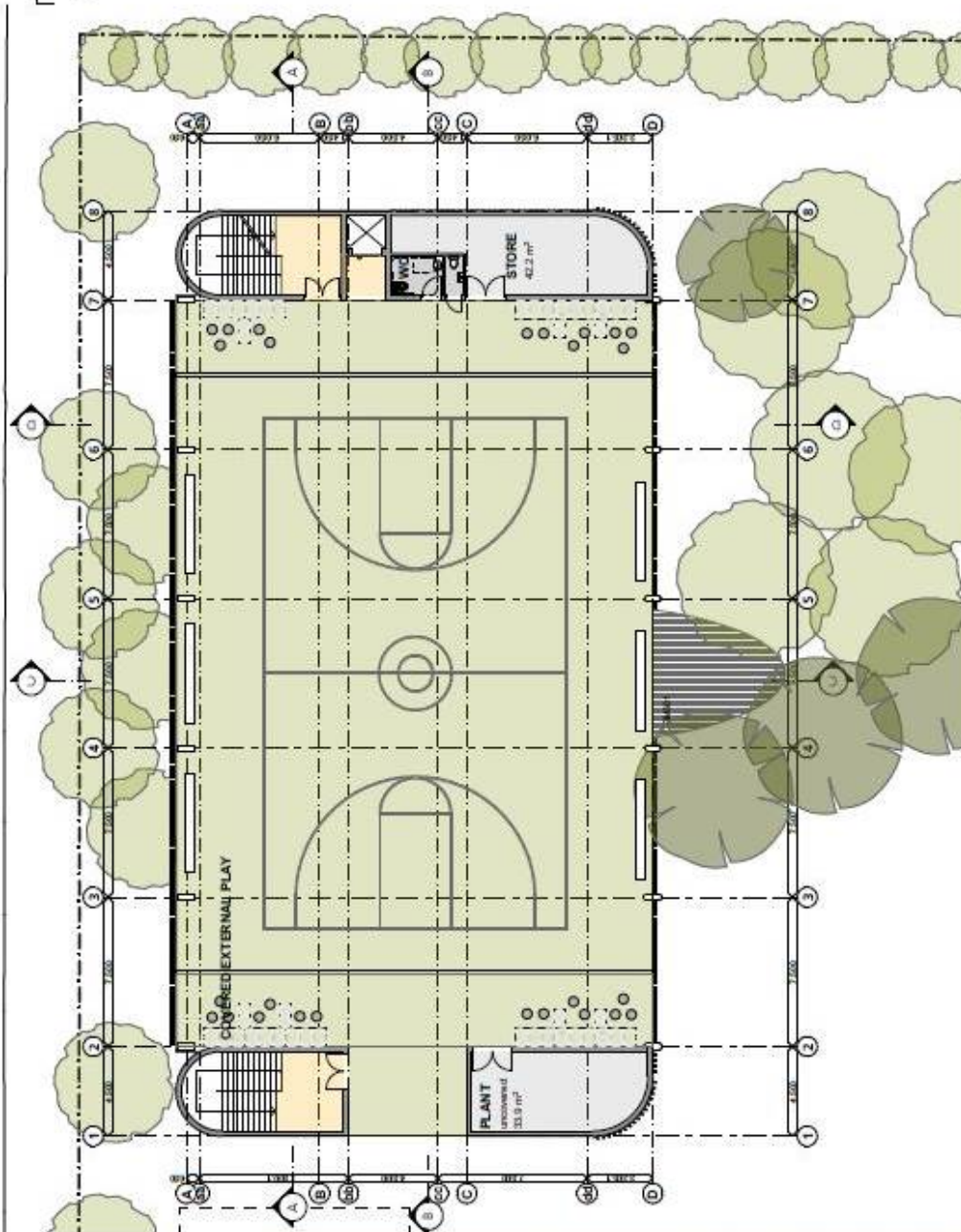


Second Floor Plan
Newcastle Grammar School - Park Campus Stage 1
Parkway Avenue, Coors Hill NSW

4293
2.23
RevP 15.10.24



10. The following are the names of the people who were involved in the project. Please write the name of the person who was the most helpful to you in the project.



SHAC



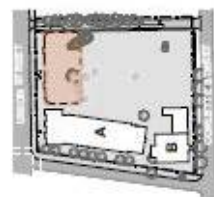
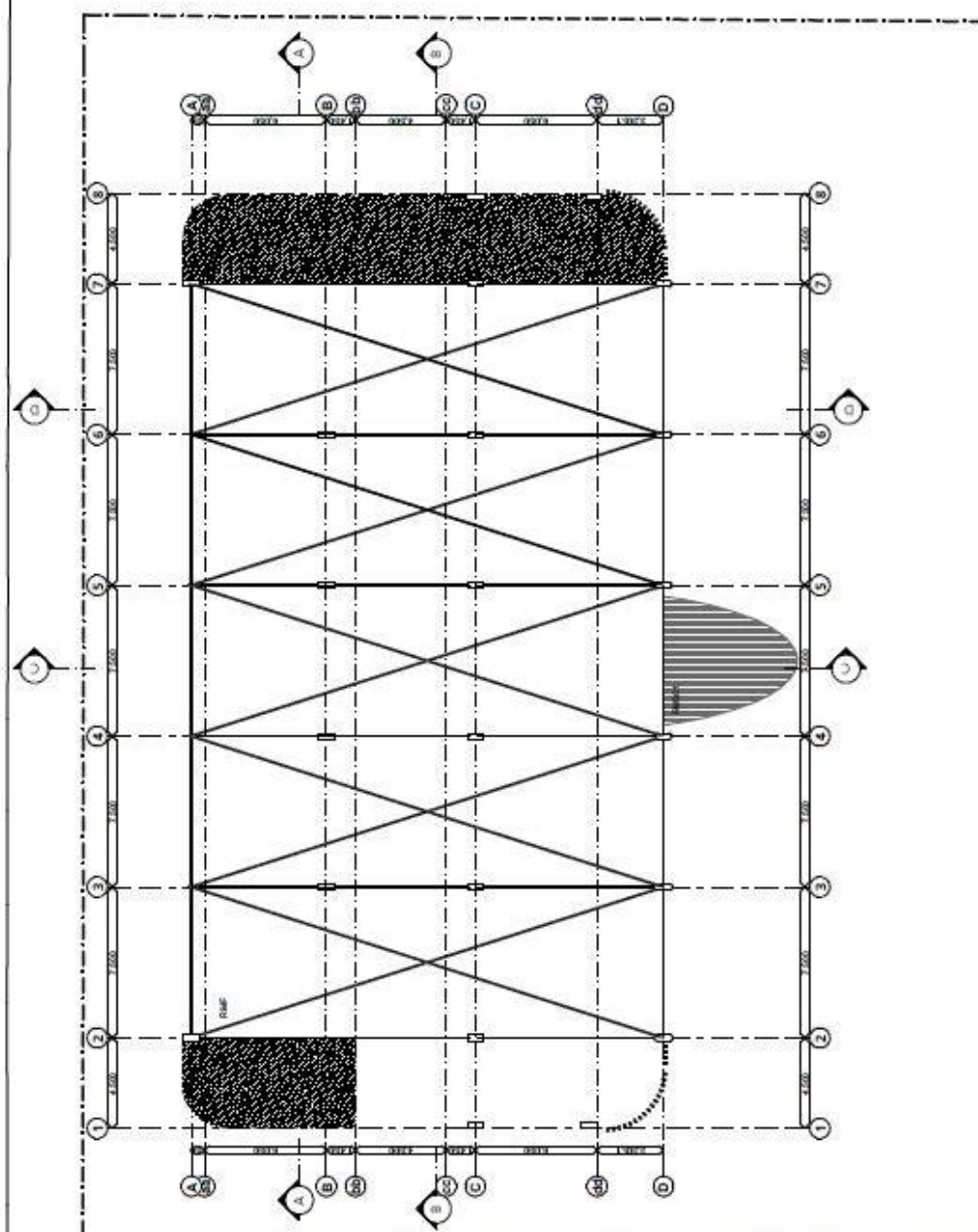
Rooftop Play
Newcastle Grammar School - Park Campus Stage 1
Parkway Avenue, Coobys Hill NSW

4293
2.24
RevO 15.10.21



SSD APPLICATION

1. *Intervista con un esperto di medicina legale, che ha lavorato per anni in un ospedale di un paese in via di sviluppo, e che ha visto molti casi di infanticidio.*



CAES



Roof Plan
Newcastle Grammar School - Park Campus Stage 1
Parkway Avenue, Cools Hill NSW

4293
2.25
RevE 15.10.24





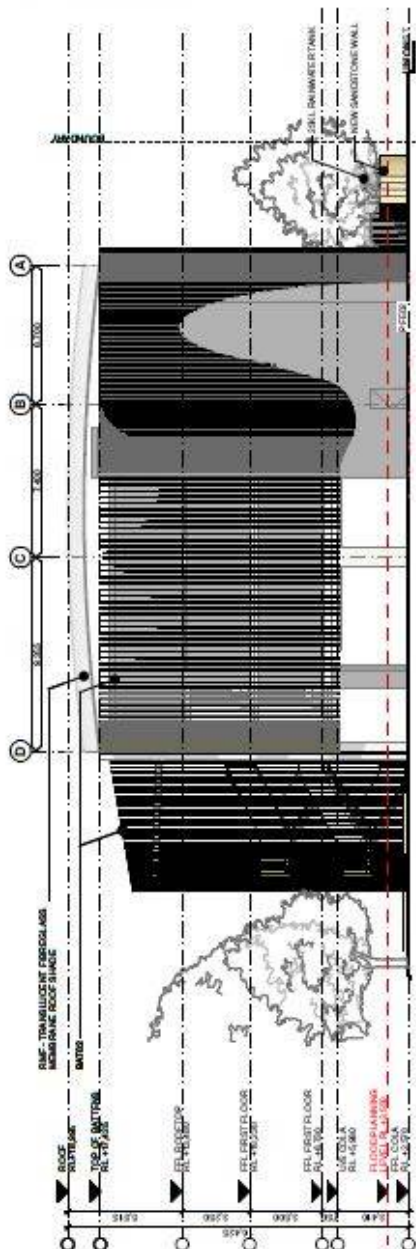


SSD APPLICATION

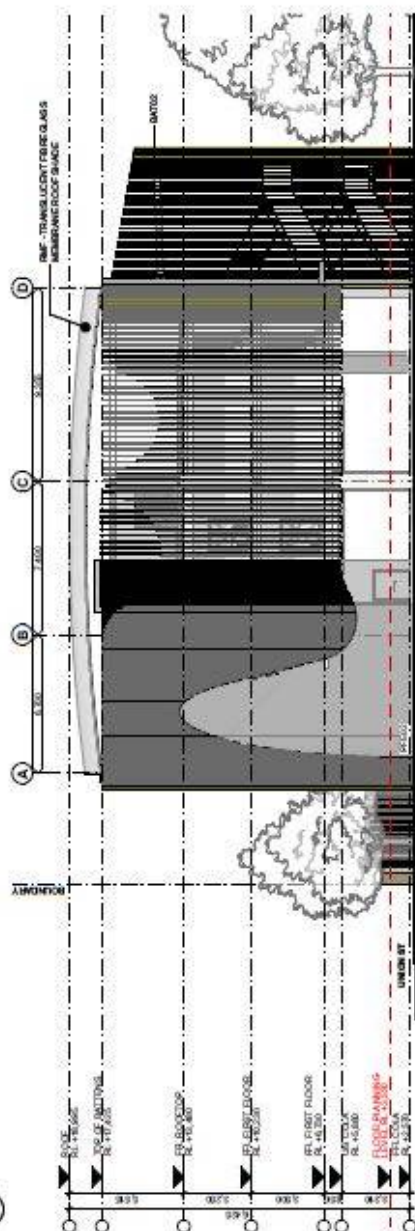
1. Material specifications and finishes to be used in the proposed building.

EXTERIOR FINISHES LEGEND

CODE	FINISH
BA103	Brush Aluminium - Steel Cornish
BA103	Brush Aluminium - Steel Tarnish
BA103	Brush Aluminium - Steel Tarnish
CT101	Cladding Stone Wall - Colours: Sun Light to Medium
PF101	Paint Finish - Natural White
PF102	Paint Finish - Blue Tinted and
PF103	Paint Finish - Blue Tinted and
ST101	Steel Mesh Screen 2mm gauge 60mm aperture



North Elevation



South Elevation

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Elevations - North & South
Newcastle Grammar School - Park Campus Stage 1
Parkway Avenue, Cooks Hill NSW

4293
2.28
Rev'd 11.03.22

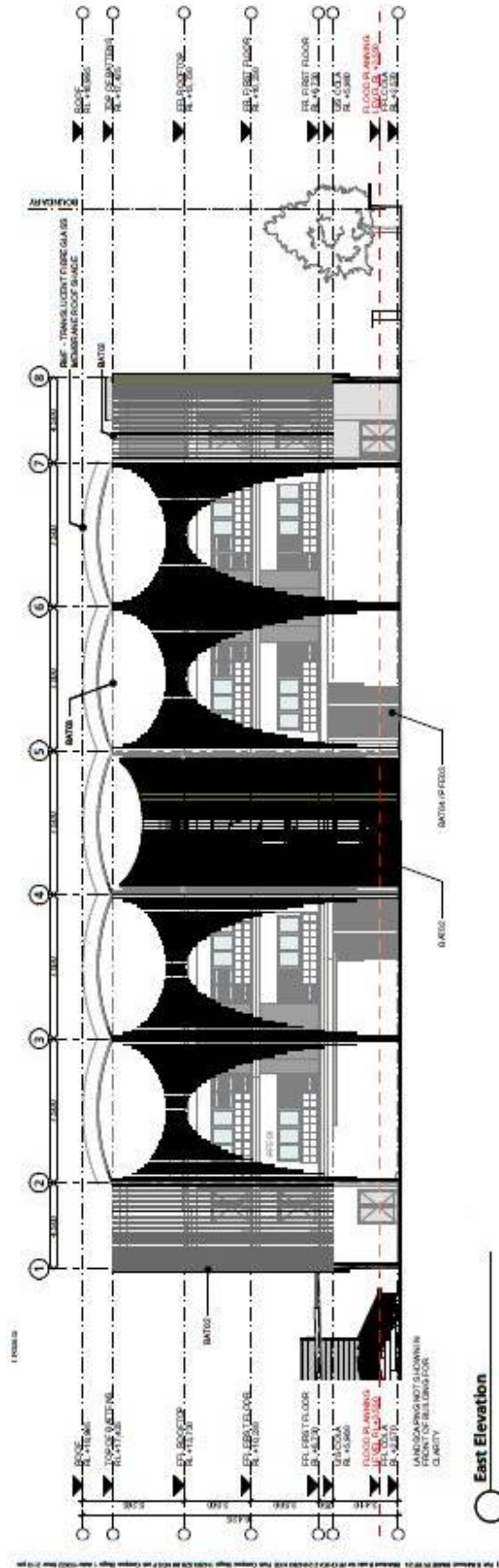


SSD APPLICATION

1. Material and finish to be applied to the building facade.
2. Apply to the building facade to be assessed for SSD.

EXTERIOR FINISHES LEGEND

CODE	FINISH
BAT02	Galvanneal Aluminium - Rust Corrosion
BAT03	Galvanneal Aluminium - Rust Corrosion
BAT04	Galvanneal Aluminium - Rust Corrosion
CST01	Cladding Stone Wall - Clean, Green Light to Medium
PR001	Paint Finish - Natural White
PR002	Paint Finish - Blue Tinted
PR003	Paint Finish - Blue Tinted
SC001	Steel Mesh Screen 2mm gauge 80mm aperture



SHAC

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Elevations - East
Newcastle Grammar School - Park Campus Stage 1
Parkway Avenue, Cooks Hill NSW

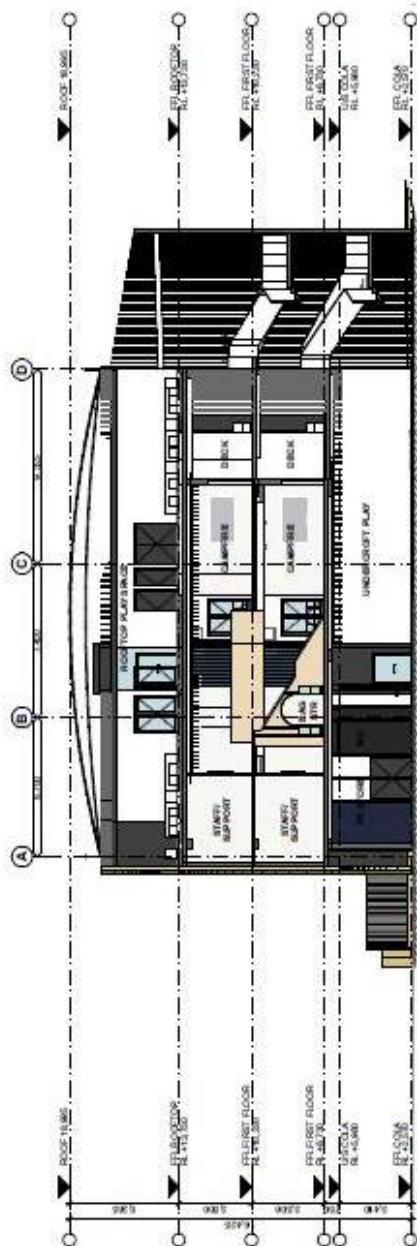
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RevL 11.03.22



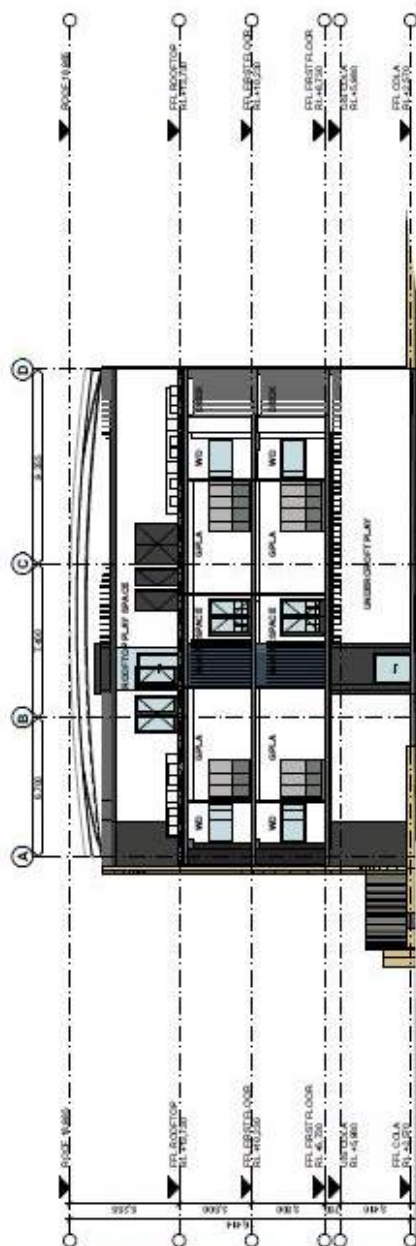


SSD APPLICATION

1. This document is a submission to the NSW Department of Transport for the purpose of obtaining a Special Street Designation (SSD) for the proposed development.
2. The proposed development is located at 127 Union Street, Cooks Hill, Newcastle Grammar School.



Section C-C



Section D-D



Sections 02
Newcastle Grammar School - Park Campus Stage 1
Parkway Avenue, Cooks Hill NSW

4293
2.31
RevH 15.10.21

SHAC
Shaping the Future of the City

ATTACHMENT B GREEN TRAVEL PLAN

NEWCASTLE GRAMMAR SCHOOL THE HILL CAMPUS

Green Travel Plan

127 Union Street, Cooks Hill

4th February 2021



Prepared for:

NSW Department of Planning, Industry & Environment

By Intersect Traffic Pty Ltd

PO Box 268

EAST MAITLAND NSW 2323

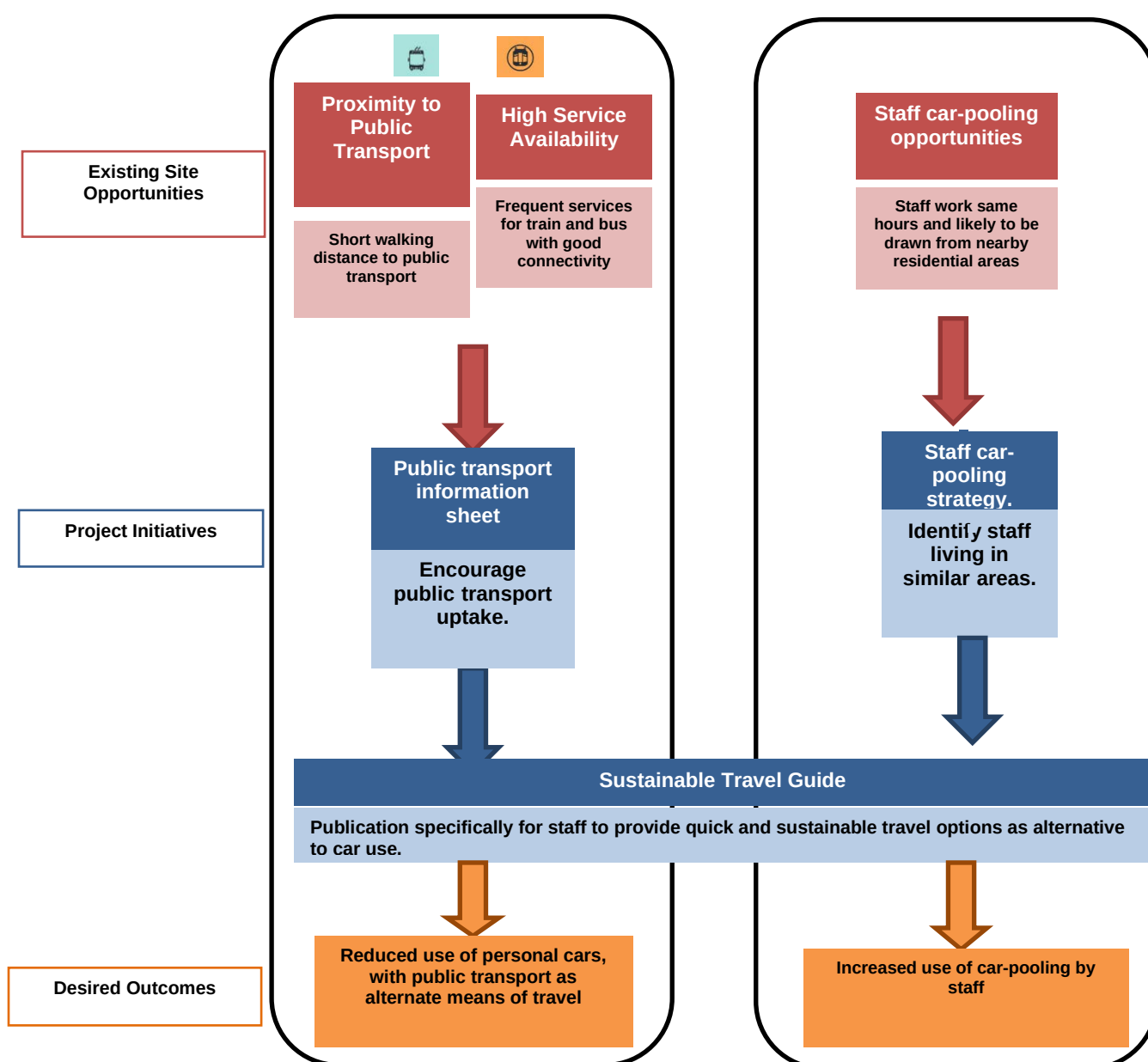


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Plan Overview

The Green Travel Plan for Newcastle Grammar School Park Campus at 127 Union Street, Cooks Hill has been developed to encourage adoption of more sustainable forms of transport as opposed to personal vehicle use by staff /students and/or to encourage car-pooling within the staff. The existing site and business opportunities (e.g.: proximity to public transport services, staff work same hours and car-sharing opportunities) have been used to develop suitability initiative that the project is committing to. The desired outcomes include reduced use of personal vehicles by staff, with public transport use and car-pooling encouraged within the staff culture.



Introduction

Scope

This green travel plan has been produced as part of the planning submission for a development consent application for the future development of the Newcastle Grammar School Park Campus and stage1 works which will increase student and staff numbers at the School as the school develops to a 4 stream school catering for students from Kindergarten to Year 6. This document outlines the strategies and actions the school is taking to encourage the use of more sustainable modes of transport by staff and students.

However, as part of the environmental commitments outlined in this report, a 'Sustainable Travel Plan' (Separate to this Green Travel Plan) will be developed particularly for the staff to provide easily and quickly accessible information on public transport and other travel mode options in the area.

Further the school will be developing and implementing active travel plans for students to encourage them to walk, cycle or catch public transport to school. These active travel plans will complement this Green Travel Plan.

Aims

The overall aim of the strategies in this plan is to reduce the number of single-occupancy car trips and promote alternative options such as walking and cycling for shorter trips and public transport or carpooling for longer trips. The benefits include:

- Reduced greenhouse gas emissions
- Improved health from reduced exposure to vehicle fumes
- Reduced contribution to photochemical smog
- Relieving stress on local road networks (congestion, parking availability etc.)
- Encouraging a reduced personal dependence on finite fossil fuel resources

The plan will require that achievable targets for sustainable travel be developed once initial survey data is available and it will be the responsibility of the Green Travel Plan Co-ordinator / School Principal to set these targets. Newcastle Grammar School as an elite private school draws students from all over the Newcastle and Lower Hunter area therefore targets for walking and cycling will be lower than for state high schools therefore emphasis will need to be on improvements to car-pooling, public transport and school bus services to reduce the reliance on single vehicle trips to the school.

Site Location and Land Use

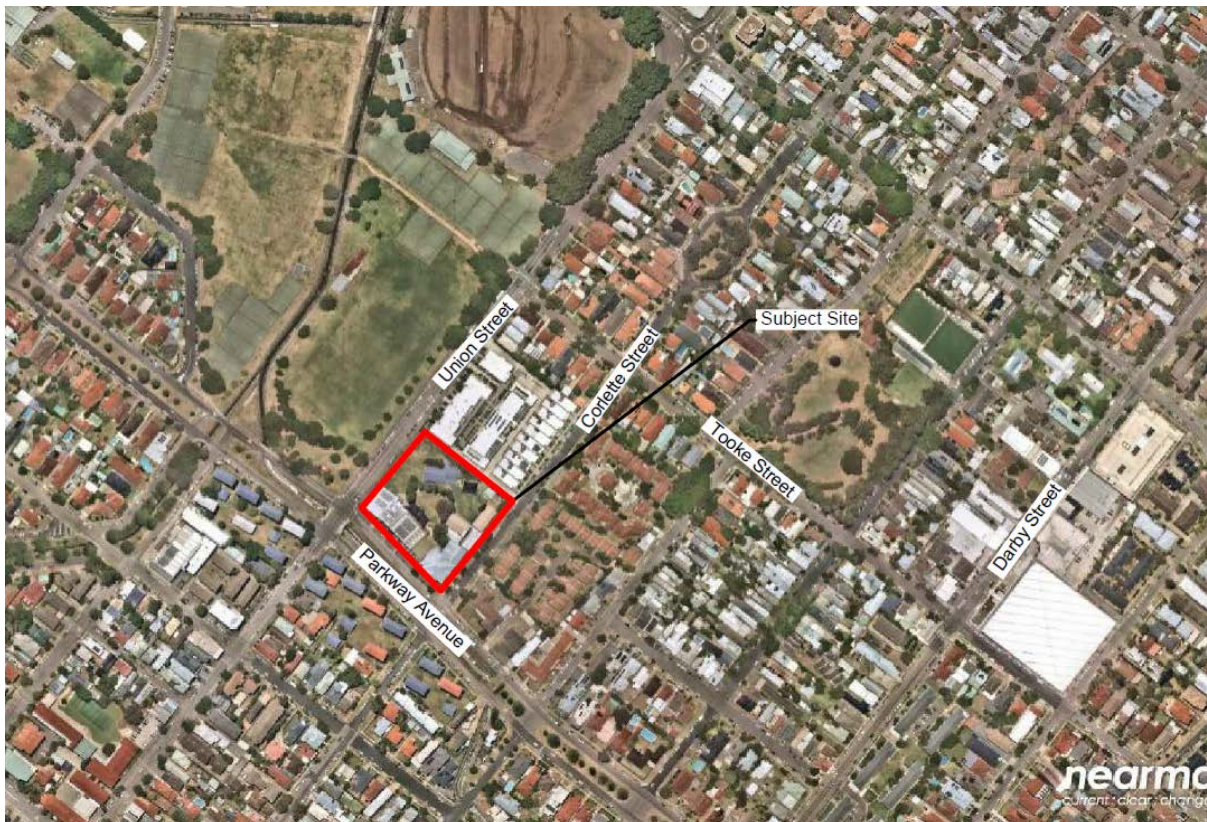
The Site

Newcastle Grammar School's Park campus is located at 127 Union Street, Cooks Hill between Union Street and Corlette Street immediately north of Parkway Avenue. The school site is shown in the figure

below. The school is within convenient walking distance to bus stops / bus services to the Newcastle CBD area and the Newcastle Transport interchange at Wickham where connection to other bus, heavy rail and light rail services is available.

Local Amenities and Facilities

The area around the school in Newcastle is diverse with residential, recreational, legal, business and retail land-uses all within walking distance of the site. It therefore has excellent accessibility to public transport facilities, public parking facilities and shops.



Existing Sustainable Transport Options

Pedestrian and Cyclist Network

An excellent concrete and asphalt pedestrian footpath network exist around the school connecting to the nearby public transport facilities and commercial areas. The adjoining Corlette Street is marked as an on-road cycleway and is part of the Newcastle Cycleways network.

Therefore it is considered there is sufficient infrastructure in place around the school site to encourage pedestrian and cycle trip making by staff and students. The school will be upgrading end of trip facilities at the school as part of this development to encourage more staff and students to cycle to school. This will include provision of additional secure bicycle storage facilities and additional staff and student showers and lockers. The use of and demand for this facilities will be monitored regularly over

the school year by the Green Travel Plan Co-ordinator to determine if planning for additional facilities in the future is required.

Rail Service

Heavy rail services commence from the Newcastle Transport Interchange at Wickham with bus routes along Hunter Street and the Newcastle Light Rail providing access to the school site from the Wickham railway interchange.

Bus Service

All the bus routes operated by Newcastle Transport as well as other limited routes run by private companies Hunter Valley Buses, Rover Coaches and Port Stephens Coaches (including Newcastle Airport Services) connect to the Newcastle Transport Interchange at Wickham. This means that a bus service to nearly every residential suburb in the lower Hunter area would stop at the intersection. Further a connection to Newcastle Transport Route 12 – Maryland to Merewether Beach via Wallsend and Newcastle would allow commuters to be dropped off in Union Street adjacent to the school. Therefore it is considered there is a suitable public transport (bus) service in place that could be used to encourage all staff and some students to utilise the service in their trip making to and from the school. A local bus route map and timetable is provided in *Appendix A*.

Car Pooling

The school will employ a total of approximately 60 staff and whilst some staff working hours may be different there will be a significant core of staff working the same hours throughout the day. An opportunity therefore exists to connect staff living in similar areas and encourage car-pooling as a measure to reduce vehicle trips to and from the site.

Sustainable Transport Initiatives

A number of sustainable transport initiatives are being incorporated into the management of the school to complement the existing transport options and provide a holistic strategy to positively influence staff and student travel behaviour.

The major project initiatives within the plan are detailed below. It should be noted that in each case, the initiatives outlined below are not soft targets, rather, the school management will commit to their implementation should the application to increase staff and student numbers be successful.

School Student Transport Scheme (SSTS)

The school will promote the school student transport scheme within its regular communications to parents and students i.e. newsletters, parent / teacher nights etc as well as hold a special information session at the commencement of each year. The SSTS provides eligible school students free or subsidised public transport from home to school.

Car-pooling initiative

The school has opportunity to encourage and implement a car pooling strategy within its staff into its management operations. The main opportunities are;

1. A committed and stable workforce of over 60 employees.
2. The majority of employees will work the same or similar hours;
3. Employees are likely to be drawn from nearby or similar residential areas or along travel paths to the site.

Therefore the car-pooling initiative will involve the School Principal or designated representative undertaking / managing the following and is a continuation of an existing system currently in place;

1. Regularly review staff residential addresses to identify groups of staff who could benefit from a car pooling system;
2. Encourage car-pooling by looking to ensure these groups of staff remain on regular and equivalent shifts / hours;
3. Provide a reward scheme (term prizes) or fuel vouchers for those involved in the car pooling scheme.

Sustainable Travel Guide

A sustainable travel guide will be developed for the School's staff to provide information and recommendations on sustainable travel options to and from the school. The guide will be readily available and structured in a manner that provides concise, relevant and easily understood information for the staff. Topics to be covered in the Sustainable Travel Guide will include;

- Access to public transport infrastructure, including
- Directions
- Walking distances and times
- Services provided by local public transport, covering
- Availability of train, light rail and bus services
- Routes covered by local services, including connections to other services
- Ticketing information for public transport, including:
- Prices and coverage of zones
- Locations of Opal Card top-up stations / machines
- Location of local facilities and amenities within walking distance and cycling distance
- Overview of cyclist provisions (bicycle storage etc.)
- Details of car-pooling benefits and strategy as well as eligibility / value for fuel voucher and rewards scheme.

Administration of Plan

This green travel plan is to be administered by the School Principal or his/her designated representative (Green Travel Plan Co-ordinator). The representative will be responsible for the following tasks to be undertaken during a school year;

- Implementation of the plan;
- Monitoring the plan;
- Amending the plan annually with modal trip changes and public transport changes.

The plan requires a champion of the plan committed to sustainable travel to fully implement the plan and make it effective. In monitoring and reviewing the plan the plan co-ordinator will be required annually to do the following;

- Update public transport routes and timetables including school bus services;
- Undertake travel mode surveys of staff and students to determine transport modal trip percentages for the school for the year;
- Compare achieved transport modal split results with desired targets and adjust targets as required;
- Introduce new strategies to achieve targets if necessary; and
- Update the Green Travel Plan in accordance with any changes annually.

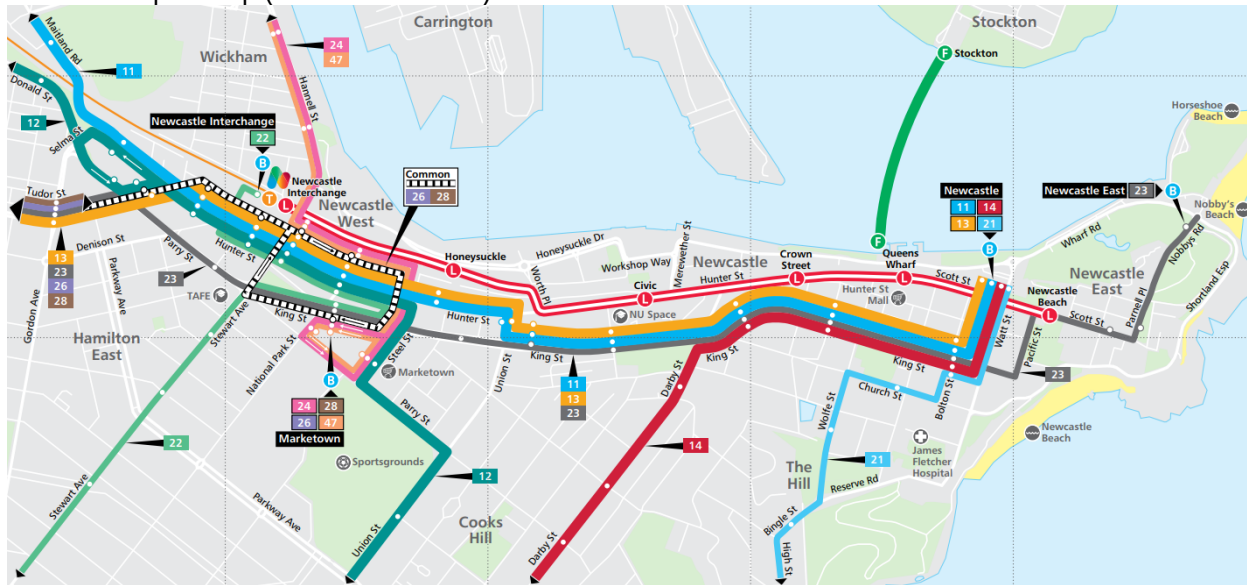
Summary

This Green Travel Plan has been developed to encourage the adoption of more sustainable forms of transport as opposed to personal vehicle use for staff and students. The existing site opportunities have been used to develop viable initiatives that enable and motivate staff and students to consider these alternatives.

The school management team is committed to embedding the principles of social responsibility across its activities and the implementation of this Green Travel Plan is, therefore, a significant element in the fulfilment of this commitment to social responsibility.

Appendix A – Bus Route Map and Timetable

Public Transport Map (Route 12 featured)



12

Maryland to Merewether Beach via Wallsend and Newcastle Interchange

B

How to use this timetable

This timetable provides a snapshot of service information in 24-hour time (e.g. 5am = 05:00, 5pm = 17:00). Information contained in this timetable is subject to change without notice. Please note that timetables do not include minor stops, additional trips for special events, short term changes, holiday timetable changes, real-time information or any disruption alerts.

For the most up-to-date times, use the Trip Planner or Departures at transportnsw.info

Real-time planning

You can plan your trip with real-time information using the Trip Planner or Departures at transportnsw.info or by downloading travel apps on your smartphone or tablet.

The Trip Planner, Departures and travel apps offer various features:

- favourite your regular trips
- see where your service is on the route
- get estimated pick-up and arrival times
- receive service updates
- find nearby stations, stops, wharves and routes
- check accessibility information.

Find the latest apps at transportnsw.info/apps

Accessible services

All new buses are wheelchair-accessible with low-level floors and space for wheelchairs, prams or strollers. Look for the  symbol in this timetable. Some older buses may not have all the features you need. There will be more accessible services as older buses are replaced.

Who is providing my bus services?

The bus services shown in this timetable are run by Newcastle Transport.

Fares

In Sydney and surrounding regions, fares are based on:

- the distance you travel from tap on to tap off
- the mode of transport you choose
- whether you're eligible for a concession fare or free travel
- any Opal benefits such as discounts and capped fares that apply.

You can use an Opal card or a contactless payment to pay for your travel.

Opal cards

An Opal card is a smartcard you keep and reuse. Add value before you travel, and tap on and tap off to pay your fares throughout Sydney, the Blue Mountains, the Central Coast, the Hunter and the Illawarra.

Which Opal card is right for you?

Adult – Customers 16 years or older who are not entitled to any concessions and normally pay full fare.

Child/Youth – For customers aged 4-15 (inclusive), or customers 16 years or older who hold a NSW/ACT Senior Secondary Student Concession Card.

Gold Senior/Pensioner – For eligible NSW and interstate seniors, pensioners, war widows/ers and asylum seekers.

Concession – For eligible tertiary students, job seekers, apprentices and trainees.

How to get an Opal card

You can get an Adult or Child/Youth Opal card over the counter at Opal retailers that display the Opal sign . To find your nearest retailer visit transportnsw.info/opal.

If you are eligible to travel with concession fares, you can apply for a Gold Senior/Pensioner or Concession Opal card online. Visit transportnsw.info/opal for more information.

Contactless payments

If you have an American Express, Mastercard, Visa card or linked device, you can use it to pay for all public transport on the Opal network. Just make sure to tap on and tap off at Opal readers at the beginning and end of your trip.

Always separate your cards when you tap on and tap off so your preferred card is charged.

You will receive the same travel benefits of an Adult Opal card when you tap on and tap off consistently with the same credit card, debit card or linked device. This includes daily, weekly and weekend travel caps, and a \$2 transfer discount when you change between metro/train, ferry, bus and light rail services within 60 minutes. Adult Opal fare pricing applies.

Find out more at transportnsw.info/contactless

Explanation of definitions and symbols

	Wheelchair Accessible
F	Friday only
L	Diverts Via Denison & Beaumont Sts Operates Early Saturday Morning Only
C	Operates Early Saturday morning only

12

Merewether Beach to Maryland via Wallsend and Newcastle Interchange



Valid from: 03 April 2022

Creation date: 01 April 2022

NOTE: Information is correct on date of download.

Monday to Friday	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Watkins St at Berner St, Merewether	05:30	06:00	06:25	06:55	07:10	07:25	07:40	07:55	08:10
Marketown Shopping Centre, Steel St, Newcastle West	05:38	06:08	06:33	07:04	07:19	07:34	07:49	08:04	08:19
Hunter St opp Cooper St, Newcastle West	05:41	06:11	06:36	07:07	07:22	07:38	07:54	08:09	08:24
Donald St at Beaumont St, Hamilton	05:45	06:15	06:40	07:11	07:26	07:42	07:59	08:14	08:29
Georgetown Rd at Bowker St, Georgetown	05:52	06:22	06:47	07:18	07:33	07:49	08:07	08:22	08:38
Newcastle Rd at Chalmers Rd, Wallsend	05:59	06:29	06:54	07:25	07:40	07:57	08:15	08:30	08:47
Cowper St at Murnin St, Wallsend	06:03	06:33	06:58	07:30	07:45	08:02	08:20	08:35	08:53
Wallsend District Library, Bunn St, Wallsend	06:05	06:35	07:00	07:32	07:47	08:04	08:22	08:37	08:56
Maryland Shopping Centre Boundary Rd, Maryland	06:14	-	07:09	-	07:56	-	08:31	-	09:06
Monday to Friday	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Watkins St at Berner St, Merewether	08:25	08:40	08:55	09:10	09:25	09:40	09:55	10:10	10:25
Marketown Shopping Centre, Steel St, Newcastle West	08:34	08:49	09:04	09:19	09:34	09:49	10:04	10:19	10:34
Hunter St opp Cooper St, Newcastle West	08:39	08:54	09:09	09:24	09:38	09:53	10:08	10:23	10:38
Donald St at Beaumont St, Hamilton	08:44	08:59	09:14	09:28	09:42	09:57	10:12	10:27	10:42
Georgetown Rd at Bowker St, Georgetown	08:52	09:07	09:21	09:35	09:50	10:05	10:20	10:35	10:50
Newcastle Rd at Chalmers Rd, Wallsend	09:00	09:16	09:28	09:43	09:58	10:13	10:28	10:43	10:58
Cowper St at Murnin St, Wallsend	09:05	09:22	09:33	09:47	10:02	10:17	10:32	10:47	11:02
Wallsend District Library, Bunn St, Wallsend	09:07	09:24	09:35	09:49	10:04	10:19	10:34	10:49	11:04
Maryland Shopping Centre Boundary Rd, Maryland	-	09:34	-	09:58	-	10:28	-	10:58	-
Monday to Friday	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Watkins St at Berner St, Merewether	10:40	10:55	11:10	11:25	11:40	11:55	12:10	12:25	12:40
Marketown Shopping Centre, Steel St, Newcastle West	10:49	11:04	11:19	11:34	11:49	12:04	12:19	12:34	12:49
Hunter St opp Cooper St, Newcastle West	10:53	11:08	11:23	11:38	11:53	12:08	12:23	12:38	12:53
Donald St at Beaumont St, Hamilton	10:57	11:12	11:27	11:42	11:57	12:12	12:27	12:42	12:57
Georgetown Rd at Bowker St, Georgetown	11:05	11:20	11:35	11:50	12:05	12:20	12:35	12:50	13:05
Newcastle Rd at Chalmers Rd, Wallsend	11:13	11:28	11:43	11:58	12:13	12:28	12:43	12:58	13:13
Cowper St at Murnin St, Wallsend	11:17	11:32	11:47	12:02	12:17	12:32	12:47	13:02	13:17
Wallsend District Library, Bunn St, Wallsend	11:19	11:34	11:49	12:04	12:19	12:34	12:49	13:04	13:19
Maryland Shopping Centre Boundary Rd, Maryland	11:28	-	11:58	-	12:28	-	12:58	-	13:28
Monday to Friday	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Watkins St at Berner St, Merewether	12:55	13:10	13:25	13:40	13:55	14:10	14:25	14:35	14:50
Marketown Shopping Centre, Steel St, Newcastle West	13:04	13:19	13:34	13:49	14:04	14:19	14:34	14:44	14:59
Hunter St opp Cooper St, Newcastle West	13:08	13:23	13:38	13:53	14:08	14:23	14:38	14:48	15:03
Donald St at Beaumont St, Hamilton	13:12	13:27	13:42	13:57	14:12	14:27	14:42	14:53	15:08
Georgetown Rd at Bowker St, Georgetown	13:20	13:35	13:50	14:05	14:20	14:37	14:51	15:02	15:17
Newcastle Rd at Chalmers Rd, Wallsend	13:28	13:43	13:58	14:13	14:28	14:46	15:00	15:14	15:28
Cowper St at Murnin St, Wallsend	13:32	13:47	14:02	14:17	14:32	14:51	15:06	15:20	15:33
Wallsend District Library, Bunn St, Wallsend	13:34	13:49	14:04	14:19	14:34	14:54	15:09	15:23	15:35
Maryland Shopping Centre Boundary Rd, Maryland	-	13:58	-	14:28	-	15:04	-	15:33	-

12

Merewether Beach to Maryland via Wallsend and Newcastle Interchange

B

Monday to Friday									
Watkins St at Berner St, Merewether	15:05	15:20	15:35	15:50	16:05	16:20	16:35	16:50	17:05
Marketown Shopping Centre, Steel St, Newcastle West	15:14	15:29	15:44	15:59	16:14	16:29	16:44	16:59	17:14
Hunter St opp Cooper St, Newcastle West	15:18	15:33	15:48	16:03	16:18	16:33	16:48	17:04	17:19
Donald St at Beaumont St, Hamilton	15:24	15:38	15:53	16:07	16:22	16:37	16:52	17:09	17:24
Georgetown Rd at Bowker St, Georgetown	15:34	15:47	16:02	16:16	16:31	16:46	17:01	17:18	17:33
Newcastle Rd at Chalmers Rd, Wallsend	15:46	15:56	16:11	16:25	16:40	16:55	17:10	17:27	17:42
Cowper St at Murnin St, Wallsend	15:52	16:01	16:16	16:30	16:45	17:01	17:15	17:32	17:47
Wallsend District Library, Bunn St, Wallsend	15:55	16:03	16:18	16:32	16:47	17:04	17:17	17:34	17:49
Maryland Shopping Centre Boundary Rd, Maryland	16:05	-	16:27	-	16:57	-	17:27	-	17:58
Monday to Friday									
Watkins St at Berner St, Merewether	17:20	17:35	17:50	18:05	18:20	18:35	18:50	19:05	19:25
Marketown Shopping Centre, Steel St, Newcastle West	17:29	17:44	17:59	18:14	18:29	18:44	18:59	19:14	19:34
Hunter St opp Cooper St, Newcastle West	17:33	17:48	18:03	18:18	18:33	18:48	19:02	19:17	19:37
Donald St at Beaumont St, Hamilton	17:37	17:52	18:07	18:22	18:37	18:52	19:06	19:21	19:41
Georgetown Rd at Bowker St, Georgetown	17:45	18:00	18:14	18:29	18:44	18:59	19:13	19:28	19:48
Newcastle Rd at Chalmers Rd, Wallsend	17:53	18:08	18:21	18:36	18:51	19:06	19:20	19:35	19:55
Cowper St at Murnin St, Wallsend	17:58	18:13	18:26	18:41	18:56	19:10	19:24	19:39	19:59
Wallsend District Library, Bunn St, Wallsend	18:00	18:15	18:28	18:43	18:58	19:12	19:26	19:41	20:01
Maryland Shopping Centre Boundary Rd, Maryland	-	18:24	-	18:52	-	19:21	-	19:50	-
Monday to Friday									
Day Restrictions							F	F	F
Watkins St near John Pde, Merewether	-	-	-	-	-	-	00:55	01:55	02:55
Watkins St at Berner St, Merewether	19:55	20:25	20:55	21:55	22:55	23:55	L00:55	L01:55	L02:55
Marketown Shopping Centre, Steel St, Newcastle West	20:03	20:33	21:03	22:03	23:03	00:03	01:03	02:03	03:03
Hunter St opp Cooper St, Newcastle West	20:06	20:36	21:06	22:06	23:06	00:06	L01:06	L02:06	L03:06
Donald St at Beaumont St, Hamilton	20:10	20:40	21:10	22:10	23:10	00:10	C01:11	C02:11	C03:11
Georgetown Rd at Bowker St, Georgetown	20:17	20:47	21:17	22:17	23:17	00:17	C01:16	C02:16	C03:16
Newcastle Rd at Chalmers Rd, Wallsend	20:24	20:54	21:24	22:24	23:24	00:24	C01:21	C02:21	C03:21
Cowper St at Murnin St, Wallsend	20:28	20:58	21:28	22:28	23:28	00:28	C01:25	C02:25	C03:25
Wallsend District Library, Bunn St, Wallsend	20:30	21:00	21:30	22:30	23:30	00:30	C01:27	C02:27	C03:27
Maryland Shopping Centre Boundary Rd, Maryland	20:39	-	21:39	22:39	23:39	00:39	C01:35	C02:35	C03:35
Saturday									
Watkins St at Berner St, Merewether	05:47	06:17	06:47	07:17	07:47	08:17	08:47	09:17	09:47
Marketown Shopping Centre, Steel St, Newcastle West	05:55	06:25	06:55	07:25	07:55	08:25	08:55	09:25	09:55
Hunter St opp Cooper St, Newcastle West	05:58	06:28	06:58	07:28	07:58	08:28	08:58	09:28	09:58
Donald St at Beaumont St, Hamilton	06:02	06:32	07:02	07:32	08:02	08:32	09:02	09:32	10:02
Georgetown Rd at Bowker St, Georgetown	06:08	06:38	07:08	07:39	08:09	08:39	09:09	09:39	10:09
Newcastle Rd at Chalmers Rd, Wallsend	06:14	06:44	07:14	07:46	08:16	08:46	09:16	09:46	10:16
Cowper St at Murnin St, Wallsend	06:18	06:48	07:18	07:51	08:21	08:51	09:21	09:51	10:21
Wallsend District Library, Bunn St, Wallsend	06:20	06:50	07:20	07:53	08:23	08:53	09:23	09:53	10:23
Maryland Shopping Centre Boundary Rd, Maryland	06:29	-	07:29	-	08:32	-	09:32	-	10:32

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Merewether Beach to Maryland via Wallsend and Newcastle Interchange

B

Saturday	6	6	6	6	6	6	6	6	6
Watkins St at Berner St, Merewether	10:17	10:47	11:17	11:47	12:17	12:47	13:17	13:47	14:17
Marketown Shopping Centre, Steel St, Newcastle West	10:25	10:55	11:25	11:55	12:25	12:55	13:25	13:55	14:25
Hunter St opp Cooper St, Newcastle West	10:28	10:58	11:28	11:58	12:28	12:58	13:28	13:58	14:28
Donald St at Beaumont St, Hamilton	10:32	11:02	11:32	12:02	12:32	13:02	13:32	14:02	14:32
Georgetown Rd at Bowker St, Georgetown	10:39	11:09	11:39	12:09	12:39	13:09	13:39	14:09	14:39
Newcastle Rd at Chalmers Rd, Wallsend	10:46	11:16	11:46	12:16	12:46	13:16	13:46	14:16	14:46
Cowper St at Murnin St, Wallsend	10:51	11:21	11:51	12:21	12:51	13:21	13:51	14:21	14:51
Wallsend District Library, Bunn St, Wallsend	10:53	11:23	11:53	12:23	12:53	13:23	13:53	14:23	14:53
Maryland Shopping Centre Boundary Rd, Maryland	-	11:32	-	12:32	-	13:32	-	14:32	-
Saturday	6	6	6	6	6	6	6	6	6
Watkins St at Berner St, Merewether	14:47	15:17	15:47	16:17	16:47	17:17	17:47	18:17	18:56
Marketown Shopping Centre, Steel St, Newcastle West	14:55	15:25	15:55	16:25	16:55	17:25	17:55	18:25	19:04
Hunter St opp Cooper St, Newcastle West	14:58	15:28	15:58	16:28	16:58	17:28	17:58	18:28	19:07
Donald St at Beaumont St, Hamilton	15:02	15:32	16:02	16:32	17:02	17:32	18:02	18:32	19:11
Georgetown Rd at Bowker St, Georgetown	15:09	15:39	16:09	16:39	17:09	17:39	18:09	18:39	19:17
Newcastle Rd at Chalmers Rd, Wallsend	15:16	15:46	16:16	16:46	17:16	17:46	18:16	18:46	19:23
Cowper St at Murnin St, Wallsend	15:21	15:51	16:21	16:51	17:21	17:51	18:21	18:51	19:27
Wallsend District Library, Bunn St, Wallsend	15:23	15:53	16:23	16:53	17:23	17:53	18:23	18:53	19:29
Maryland Shopping Centre Boundary Rd, Maryland	15:32	-	16:32	-	17:32	-	18:32	-	19:38
Saturday	6	6	6	6	6	6	6	6	6
Watkins St near John Pde, Merewether	-	-	-	-	-	00:55	01:55	02:55	
Watkins St at Berner St, Merewether	19:56	20:56	21:56	22:56	23:56	L00:55	L01:55	L02:55	
Marketown Shopping Centre, Steel St, Newcastle West	20:04	21:04	22:04	23:04	00:04	01:03	02:03	03:03	
Hunter St opp Cooper St, Newcastle West	20:07	21:07	22:07	23:07	00:07	L01:06	L02:06	L03:06	
Donald St at Beaumont St, Hamilton	20:11	21:11	22:11	23:11	00:11	C01:11	C02:11	C03:11	
Georgetown Rd at Bowker St, Georgetown	20:17	21:17	22:17	23:17	00:17	C01:16	C02:16	C03:16	
Newcastle Rd at Chalmers Rd, Wallsend	20:23	21:23	22:23	23:23	00:23	C01:21	C02:21	C03:21	
Cowper St at Murnin St, Wallsend	20:27	21:27	22:27	23:27	00:27	C01:25	C02:25	C03:25	
Wallsend District Library, Bunn St, Wallsend	20:29	21:29	22:29	23:29	00:29	C01:27	C02:27	C03:27	
Maryland Shopping Centre Boundary Rd, Maryland	20:38	21:38	22:38	23:38	00:38	C01:35	C02:35	C03:35	
Sunday & Public Holidays	6	6	6	6	6	6	6	6	6
Watkins St at Berner St, Merewether	05:47	06:47	07:17	07:47	08:17	08:47	09:17	09:47	10:17
Marketown Shopping Centre, Steel St, Newcastle West	05:55	06:55	07:25	07:55	08:25	08:55	09:25	09:55	10:25
Hunter St opp Cooper St, Newcastle West	05:58	06:58	07:28	07:58	08:28	08:58	09:28	09:58	10:28
Donald St at Beaumont St, Hamilton	06:02	07:02	07:32	08:02	08:32	09:02	09:32	10:02	10:32
Georgetown Rd at Bowker St, Georgetown	06:08	07:08	07:38	08:09	08:39	09:09	09:39	10:09	10:39
Newcastle Rd at Chalmers Rd, Wallsend	06:14	07:14	07:44	08:16	08:46	09:16	09:46	10:16	10:46
Cowper St at Murnin St, Wallsend	06:18	07:18	07:48	08:20	08:50	09:20	09:50	10:20	10:50
Wallsend District Library, Bunn St, Wallsend	06:20	07:20	07:50	08:22	08:52	09:22	09:52	10:22	10:52
Maryland Shopping Centre Boundary Rd, Maryland	06:29	07:29	-	08:31	-	09:31	-	10:31	-

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**Merewether Beach to Maryland via
Wallsend and Newcastle Interchange**


Sunday & Public Holidays	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Watkins St at Berner St, Merewether	10:47	11:17	11:47	12:17	12:47	13:17	13:47	14:17	14:47
Marketown Shopping Centre, Steel St, Newcastle West	10:55	11:25	11:55	12:25	12:55	13:25	13:55	14:25	14:55
Hunter St opp Cooper St, Newcastle West	10:58	11:28	11:58	12:28	12:58	13:28	13:58	14:28	14:58
Donald St at Beaumont St, Hamilton	11:02	11:32	12:02	12:32	13:02	13:32	14:02	14:32	15:02
Georgetown Rd at Bowker St, Georgetown	11:09	11:39	12:09	12:39	13:09	13:39	14:09	14:39	15:09
Newcastle Rd at Chalmers Rd, Wallsend	11:16	11:46	12:16	12:46	13:16	13:46	14:16	14:46	15:16
Cowper St at Murnin St, Wallsend	11:20	11:50	12:20	12:50	13:20	13:50	14:20	14:50	15:20
Wallsend District Library, Bunn St, Wallsend	11:22	11:52	12:22	12:52	13:22	13:52	14:22	14:52	15:22
Maryland Shopping Centre Boundary Rd, Maryland	11:31	-	12:31	-	13:31	-	14:31	-	15:31
Sunday & Public Holidays	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Watkins St at Berner St, Merewether	15:17	15:47	16:17	16:47	17:17	17:47	18:17	18:56	19:56
Marketown Shopping Centre, Steel St, Newcastle West	15:25	15:55	16:25	16:55	17:25	17:55	18:25	19:04	20:04
Hunter St opp Cooper St, Newcastle West	15:28	15:58	16:28	16:58	17:28	17:58	18:28	19:07	20:07
Donald St at Beaumont St, Hamilton	15:32	16:02	16:32	17:02	17:32	18:02	18:32	19:11	20:11
Georgetown Rd at Bowker St, Georgetown	15:39	16:09	16:39	17:09	17:39	18:09	18:39	19:17	20:17
Newcastle Rd at Chalmers Rd, Wallsend	15:46	16:16	16:46	17:16	17:46	18:16	18:46	19:23	20:23
Cowper St at Murnin St, Wallsend	15:50	16:20	16:50	17:20	17:50	18:20	18:50	19:27	20:27
Wallsend District Library, Bunn St, Wallsend	15:52	16:22	16:52	17:22	17:52	18:22	18:52	19:29	20:29
Maryland Shopping Centre Boundary Rd, Maryland	-	16:31	-	17:31	-	18:31	-	19:38	20:38
Sunday & Public Holidays	Δ	Δ	Δ						
Watkins St at Berner St, Merewether	20:56	21:56	22:56						
Marketown Shopping Centre, Steel St, Newcastle West	21:04	22:04	23:04						
Hunter St opp Cooper St, Newcastle West	21:07	22:07	23:07						
Donald St at Beaumont St, Hamilton	21:11	22:11	23:11						
Georgetown Rd at Bowker St, Georgetown	21:17	22:17	23:17						
Newcastle Rd at Chalmers Rd, Wallsend	21:23	22:23	23:23						
Cowper St at Murnin St, Wallsend	21:27	22:27	23:27						
Wallsend District Library, Bunn St, Wallsend	21:29	22:29	23:29						
Maryland Shopping Centre Boundary Rd, Maryland	21:38	22:38	23:38						

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Maryland to Merewether Beach via Wallsend and Newcastle Interchange



Monday to Friday									
Maryland Shopping Centre Boundary Rd, Maryland	-	05:30	-	06:25	-	06:50	-	07:19	-
Wallsend District Library, Bunn St, Wallsend	05:15	05:40	06:05	06:35	06:50	07:00	07:15	07:30	07:45
Newcastle Rd at Blue Gum Rd, Jesmond	05:21	05:46	06:11	06:41	06:56	07:06	07:23	07:38	07:53
Tinonee Gardens The Multicultural Village, Christo Rd, Waratah	05:25	05:52	06:15	06:47	07:00	07:13	07:29	07:47	08:02
Donald St at Bennett St, Hamilton	05:34	05:59	06:24	06:54	07:09	07:21	07:38	07:56	08:13
Hunter St at Florence St, Newcastle West	05:37	06:02	06:27	06:57	07:12	07:25	07:42	08:00	08:17
Marketown Shopping Centre, Steel St, Newcastle West	05:41	06:06	06:31	07:01	07:17	07:29	07:46	08:04	08:21
Watkins St at Berner St, Merewether	05:50	06:15	06:40	07:10	07:26	07:38	07:55	08:13	08:30
Monday to Friday									
Maryland Shopping Centre Boundary Rd, Maryland	07:44	-	08:10	-	08:40	-	09:10	-	09:40
Wallsend District Library, Bunn St, Wallsend	07:55	08:05	08:20	08:35	08:50	09:05	09:20	09:35	09:50
Newcastle Rd at Blue Gum Rd, Jesmond	08:03	08:12	08:28	08:41	08:56	09:11	09:26	09:41	09:56
Tinonee Gardens The Multicultural Village, Christo Rd, Waratah	08:13	08:20	08:37	08:48	09:04	09:17	09:33	09:46	10:03
Donald St at Bennett St, Hamilton	08:23	08:31	08:47	08:58	09:13	09:26	09:41	09:56	10:11
Hunter St at Florence St, Newcastle West	08:27	08:36	08:52	09:03	09:18	09:30	09:45	10:00	10:15
Marketown Shopping Centre, Steel St, Newcastle West	08:31	08:41	08:57	09:08	09:23	09:34	09:50	10:04	10:19
Watkins St at Berner St, Merewether	08:40	08:52	09:07	09:18	09:33	09:43	10:00	10:13	10:28
Monday to Friday									
Maryland Shopping Centre Boundary Rd, Maryland	-	10:10	-	10:40	-	11:10	-	11:40	-
Wallsend District Library, Bunn St, Wallsend	10:05	10:20	10:35	10:50	11:05	11:20	11:35	11:50	12:05
Newcastle Rd at Blue Gum Rd, Jesmond	10:11	10:26	10:41	10:56	11:11	11:26	11:41	11:56	12:11
Tinonee Gardens The Multicultural Village, Christo Rd, Waratah	10:16	10:33	10:46	11:03	11:16	11:33	11:46	12:03	12:16
Donald St at Bennett St, Hamilton	10:26	10:41	10:56	11:11	11:26	11:41	11:56	12:11	12:26
Hunter St at Florence St, Newcastle West	10:30	10:45	11:00	11:15	11:30	11:45	12:00	12:15	12:30
Marketown Shopping Centre, Steel St, Newcastle West	10:34	10:49	11:04	11:19	11:34	11:49	12:04	12:19	12:34
Watkins St at Berner St, Merewether	10:43	10:58	11:13	11:28	11:43	11:58	12:13	12:28	12:43
Monday to Friday									
Maryland Shopping Centre Boundary Rd, Maryland	12:10	-	12:40	-	13:10	-	13:40	-	14:10
Wallsend District Library, Bunn St, Wallsend	12:20	12:35	12:50	13:05	13:20	13:35	13:50	14:05	14:20
Newcastle Rd at Blue Gum Rd, Jesmond	12:26	12:41	12:56	13:11	13:26	13:41	13:56	14:11	14:26
Tinonee Gardens The Multicultural Village, Christo Rd, Waratah	12:33	12:46	13:03	13:16	13:33	13:46	14:03	14:16	14:33
Donald St at Bennett St, Hamilton	12:41	12:56	13:11	13:26	13:41	13:56	14:11	14:26	14:41
Hunter St at Florence St, Newcastle West	12:45	13:00	13:15	13:30	13:45	14:00	14:15	14:30	14:45
Marketown Shopping Centre, Steel St, Newcastle West	12:49	13:04	13:19	13:34	13:49	14:04	14:19	14:34	14:49
Watkins St at Berner St, Merewether	12:58	13:13	13:28	13:43	13:58	14:13	14:28	14:43	14:58

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Maryland to Merewether Beach via Wallsend and Newcastle Interchange

B

Monday to Friday	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Maryland Shopping Centre Boundary Rd, Maryland	-	14:40	-	15:10	-	15:40	-	16:10	-
Wallsend District Library, Bunn St, Wallsend	14:35	14:50	15:05	15:20	15:36	15:50	16:05	16:20	16:35
Newcastle Rd at Blue Gum Rd, Jesmond	14:41	14:56	15:11	15:26	15:42	15:56	16:11	16:26	16:41
Tinonee Gardens The Multicultural Village, Christo Rd, Waratah	14:46	15:03	15:17	15:34	15:47	16:03	16:16	16:33	16:46
Donald St at Bennett St, Hamilton	14:56	15:11	15:28	15:43	15:57	16:11	16:26	16:41	16:56
Hunter St at Florence St, Newcastle West	15:00	15:15	15:33	15:48	16:01	16:15	16:30	16:45	17:00
Marketown Shopping Centre, Steel St, Newcastle West	15:04	15:19	15:38	15:53	16:06	16:19	16:34	16:49	17:04
Watkins St at Berner St, Merewether	15:13	15:28	15:48	16:03	16:16	16:28	16:43	16:58	17:13
Monday to Friday	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Maryland Shopping Centre Boundary Rd, Maryland	16:40	-	17:10	-	17:40	-	18:10	-	18:40
Wallsend District Library, Bunn St, Wallsend	16:50	17:05	17:20	17:35	17:50	18:05	18:20	18:35	18:50
Newcastle Rd at Blue Gum Rd, Jesmond	16:56	17:12	17:26	17:41	17:56	18:11	18:26	18:41	18:56
Tinonee Gardens The Multicultural Village, Christo Rd, Waratah	17:03	17:17	17:32	17:45	18:02	18:15	18:32	18:45	19:02
Donald St at Bennett St, Hamilton	17:11	17:27	17:40	17:55	18:10	18:25	18:40	18:55	19:09
Hunter St at Florence St, Newcastle West	17:15	17:30	17:43	17:58	18:13	18:28	18:43	18:58	19:12
Marketown Shopping Centre, Steel St, Newcastle West	17:19	17:34	17:47	18:02	18:17	18:32	18:47	19:02	19:16
Watkins St at Berner St, Merewether	17:28	17:43	17:56	18:11	18:26	18:40	18:55	19:10	19:24
Monday to Friday	Δ	Δ	Δ	Δ	Δ	Δ			
Maryland Shopping Centre Boundary Rd, Maryland	-	19:40	-	20:50	21:50	22:50			
Wallsend District Library, Bunn St, Wallsend	19:20	19:50	20:20	21:00	22:00	23:00			
Newcastle Rd at Blue Gum Rd, Jesmond	19:26	19:56	20:26	21:06	22:06	23:06			
Tinonee Gardens The Multicultural Village, Christo Rd, Waratah	19:30	20:02	20:30	21:12	22:12	23:12			
Donald St at Bennett St, Hamilton	19:39	20:09	20:39	21:19	22:18	23:18			
Hunter St at Florence St, Newcastle West	19:42	20:12	20:42	21:22	22:22	23:22			
Marketown Shopping Centre, Steel St, Newcastle West	19:46	20:16	20:46	21:26	22:26	23:26			
Watkins St at Berner St, Merewether	19:54	20:24	20:54	21:34	22:34	23:34			
Saturday	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Maryland Shopping Centre Boundary Rd, Maryland	-	-	06:42	-	07:42	-	08:42	-	09:42
Wallsend District Library, Bunn St, Wallsend	05:52	06:22	06:52	07:22	07:52	08:22	08:52	09:22	09:52
Newcastle Rd at Blue Gum Rd, Jesmond	05:58	06:28	06:58	07:28	07:58	08:28	08:58	09:28	09:58
Tinonee Gardens The Multicultural Village, Christo Rd, Waratah	06:02	06:32	07:01	07:32	08:05	08:33	09:04	09:33	10:04
Donald St at Bennett St, Hamilton	06:11	06:41	07:11	07:41	08:12	08:42	09:12	09:42	10:12
Hunter St at Florence St, Newcastle West	06:13	06:43	07:13	07:43	08:15	08:45	09:15	09:45	10:15
Marketown Shopping Centre, Steel St, Newcastle West	06:17	06:47	07:17	07:47	08:19	08:49	09:19	09:49	10:19
Watkins St at Berner St, Merewether	06:25	06:55	07:26	07:56	08:28	08:58	09:28	09:58	10:28

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Maryland to Merewether Beach via Wallsend and Newcastle Interchange



Saturday	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Maryland Shopping Centre Boundary Rd, Maryland	-	10:42	-	11:42	-	12:42	-	13:42	-
Wallsend District Library, Bunn St, Wallsend	10:22	10:52	11:22	11:52	12:22	12:52	13:22	13:52	14:22
Newcastle Rd at Blue Gum Rd, Jesmond	10:28	10:58	11:28	11:58	12:28	12:58	13:28	13:58	14:28
Tinonee Gardens The Multicultural Village, Christo Rd, Waratah	10:33	11:04	11:33	12:04	12:33	13:04	13:33	14:04	14:33
Donald St at Bennett St, Hamilton	10:42	11:12	11:42	12:12	12:42	13:12	13:42	14:12	14:42
Hunter St at Florence St, Newcastle West	10:45	11:15	11:45	12:15	12:45	13:15	13:45	14:15	14:45
Marketown Shopping Centre, Steel St, Newcastle West	10:49	11:19	11:49	12:19	12:49	13:19	13:49	14:19	14:49
Watkins St at Berner St, Merewether	10:58	11:28	11:58	12:28	12:58	13:28	13:58	14:28	14:58
Saturday	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Maryland Shopping Centre Boundary Rd, Maryland	14:42	-	15:42	-	16:42	-	17:42	-	18:47
Wallsend District Library, Bunn St, Wallsend	14:52	15:22	15:52	16:22	16:52	17:22	17:52	18:22	18:57
Newcastle Rd at Blue Gum Rd, Jesmond	14:58	15:28	15:58	16:28	16:58	17:28	17:58	18:28	19:03
Tinonee Gardens The Multicultural Village, Christo Rd, Waratah	15:04	15:33	16:04	16:33	17:04	17:33	18:04	18:33	19:09
Donald St at Bennett St, Hamilton	15:12	15:42	16:12	16:42	17:12	17:42	18:12	18:42	19:16
Hunter St at Florence St, Newcastle West	15:15	15:45	16:15	16:45	17:15	17:45	18:15	18:45	19:18
Marketown Shopping Centre, Steel St, Newcastle West	15:19	15:49	16:19	16:49	17:19	17:49	18:19	18:49	19:22
Watkins St at Berner St, Merewether	15:28	15:58	16:28	16:58	17:28	17:58	18:27	18:57	19:30
Saturday	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Maryland Shopping Centre Boundary Rd, Maryland	19:50	20:50	21:50	22:50	23:50				
Wallsend District Library, Bunn St, Wallsend	20:00	21:00	22:00	23:00	00:00				
Newcastle Rd at Blue Gum Rd, Jesmond	20:06	21:06	22:06	23:06	00:06				
Tinonee Gardens The Multicultural Village, Christo Rd, Waratah	20:12	21:12	22:12	23:12	00:12				
Donald St at Bennett St, Hamilton	20:19	21:19	22:19	23:19	00:19				
Hunter St at Florence St, Newcastle West	20:21	21:21	22:21	23:21	00:21				
Marketown Shopping Centre, Steel St, Newcastle West	20:25	21:25	22:25	23:25	00:25				
Watkins St at Berner St, Merewether	20:33	21:33	22:33	23:33	00:33				
Sunday & Public Holidays	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Maryland Shopping Centre Boundary Rd, Maryland	-	06:42	-	07:42	-	08:42	-	09:42	-
Wallsend District Library, Bunn St, Wallsend	05:52	06:52	07:22	07:52	08:22	08:52	09:22	09:52	10:22
Newcastle Rd at Blue Gum Rd, Jesmond	05:58	06:58	07:28	07:58	08:28	08:58	09:28	09:58	10:28
Tinonee Gardens The Multicultural Village, Christo Rd, Waratah	06:02	07:00	07:32	08:05	08:33	09:04	09:33	10:04	10:33
Donald St at Bennett St, Hamilton	06:11	07:11	07:41	08:12	08:42	09:12	09:42	10:12	10:42
Hunter St at Florence St, Newcastle West	06:13	07:13	07:43	08:15	08:45	09:15	09:45	10:15	10:45
Marketown Shopping Centre, Steel St, Newcastle West	06:17	07:17	07:47	08:19	08:49	09:19	09:49	10:19	10:49
Watkins St at Berner St, Merewether	06:26	07:26	07:56	08:28	08:58	09:28	09:58	10:28	10:58

12

Maryland to Merewether Beach via Wallsend and Newcastle Interchange

B

Sunday & Public Holidays	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Maryland Shopping Centre Boundary Rd, Maryland	10:42	-	11:42	-	12:42	-	13:42	-	14:42
Wallsend District Library, Bunn St, Wallsend	10:52	11:22	11:52	12:22	12:52	13:22	13:52	14:22	14:52
Newcastle Rd at Blue Gum Rd, Jesmond	10:58	11:28	11:58	12:28	12:58	13:28	13:58	14:28	14:58
Tinonee Gardens The Multicultural Village, Christo Rd, Waratah	11:04	11:33	12:04	12:33	13:04	13:33	14:04	14:33	15:04
Donald St at Bennett St, Hamilton	11:12	11:42	12:12	12:42	13:12	13:42	14:12	14:42	15:12
Hunter St at Florence St, Newcastle West	11:15	11:45	12:15	12:45	13:15	13:45	14:15	14:45	15:15
Marketown Shopping Centre, Steel St, Newcastle West	11:19	11:49	12:19	12:49	13:19	13:49	14:19	14:49	15:19
Watkins St at Berner St, Merewether	11:28	11:58	12:28	12:58	13:28	13:58	14:28	14:58	15:28
Sunday & Public Holidays	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Maryland Shopping Centre Boundary Rd, Maryland	-	15:42	-	16:42	-	17:42	-	18:42	19:50
Wallsend District Library, Bunn St, Wallsend	15:22	15:52	16:22	16:52	17:22	17:52	18:22	18:57	20:00
Newcastle Rd at Blue Gum Rd, Jesmond	15:28	15:58	16:28	16:58	17:28	17:58	18:28	19:03	20:06
Tinonee Gardens The Multicultural Village, Christo Rd, Waratah	15:33	16:04	16:33	17:04	17:33	18:04	18:33	19:09	20:12
Donald St at Bennett St, Hamilton	15:42	16:12	16:42	17:12	17:42	18:12	18:42	19:16	20:19
Hunter St at Florence St, Newcastle West	15:45	16:15	16:45	17:15	17:45	18:15	18:45	19:18	20:21
Marketown Shopping Centre, Steel St, Newcastle West	15:49	16:19	16:49	17:19	17:49	18:19	18:49	19:22	20:25
Watkins St at Berner St, Merewether	15:58	16:28	16:58	17:28	17:58	18:27	18:57	19:30	20:33
Sunday & Public Holidays	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Maryland Shopping Centre Boundary Rd, Maryland	20:50	21:50	22:50						
Wallsend District Library, Bunn St, Wallsend	21:00	22:00	23:00						
Newcastle Rd at Blue Gum Rd, Jesmond	21:06	22:06	23:06						
Tinonee Gardens The Multicultural Village, Christo Rd, Waratah	21:12	22:12	23:12						
Donald St at Bennett St, Hamilton	21:19	22:19	23:19						
Hunter St at Florence St, Newcastle West	21:21	22:21	23:21						
Marketown Shopping Centre, Steel St, Newcastle West	21:25	22:25	23:25						
Watkins St at Berner St, Merewether	21:33	22:33	23:33						

Appendix B – Travel Mode Survey

Newcastle Grammar School – Park Campus

Staff and Student Travel Mode Survey

Year: - _____

Tick appropriate boxes

Name : - _____ Staff ☐ Student ☐

If Student School Year : - _____

What is your most frequent method of travel to and from school each week ?

Car as driver ☐ Car as passenger ☐ Public Transport ☐

School Bus Service by NGS ☐ School Bus Service by other provider ☐

Ride Bicycle ☐ Walk ☐ Other ☐

If Other please Specify:- _____

If you travel to and from school in cars what prevents you from considering alternative transport modes as described above?

ATTACHMENT C TRAFFIC COUNT DATA

3/12/2020 - PARKWAY AVE / UNION ST, COOKS HILL

9:00 <<< HOUR ENDING

Thursday

Summary: PARKWAY AVE / UNION ST

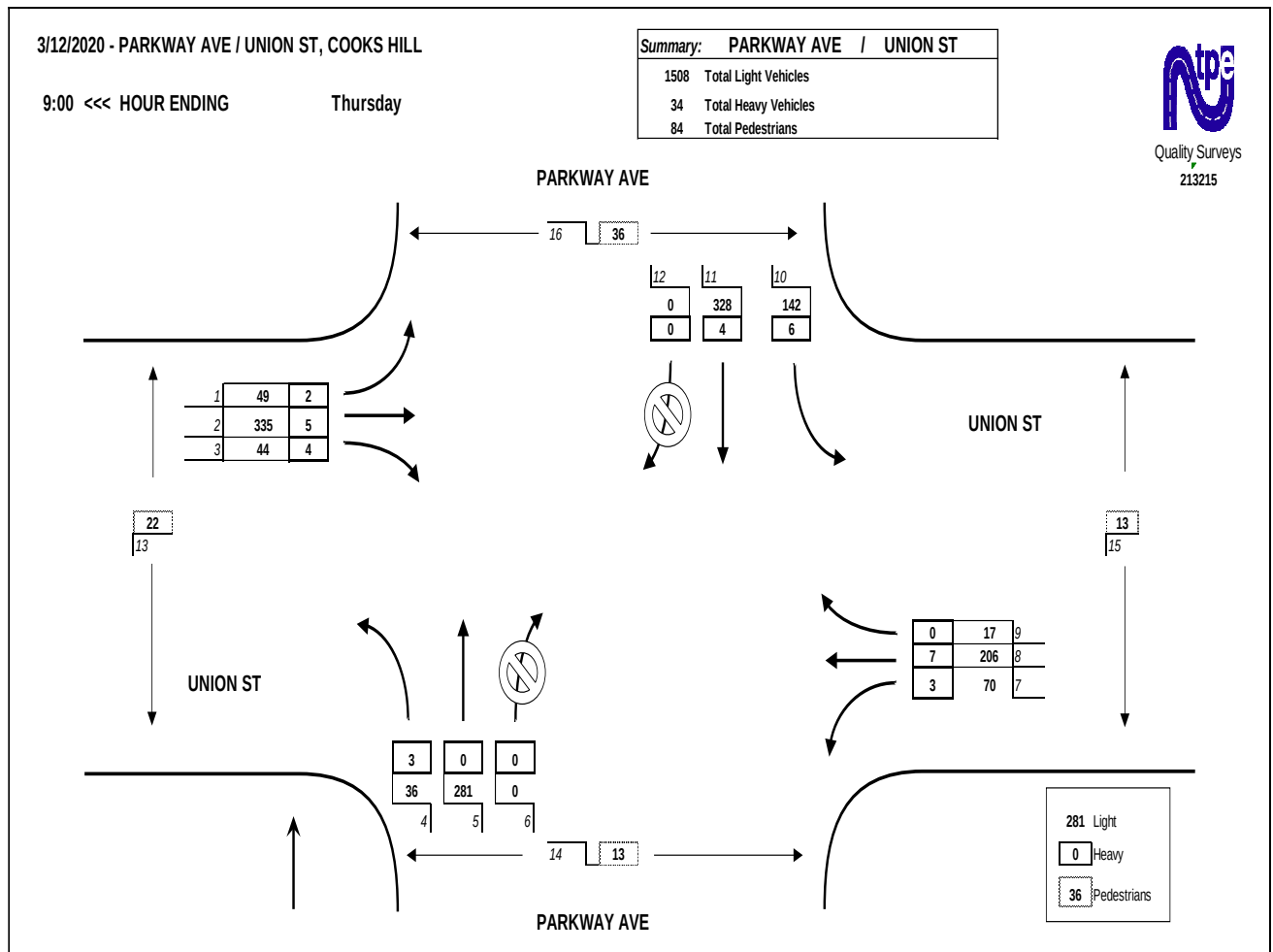
1508 Total Light Vehicles

34 Total Heavy Vehicles

84 Total Pedestrians



Quality Surveys
213215



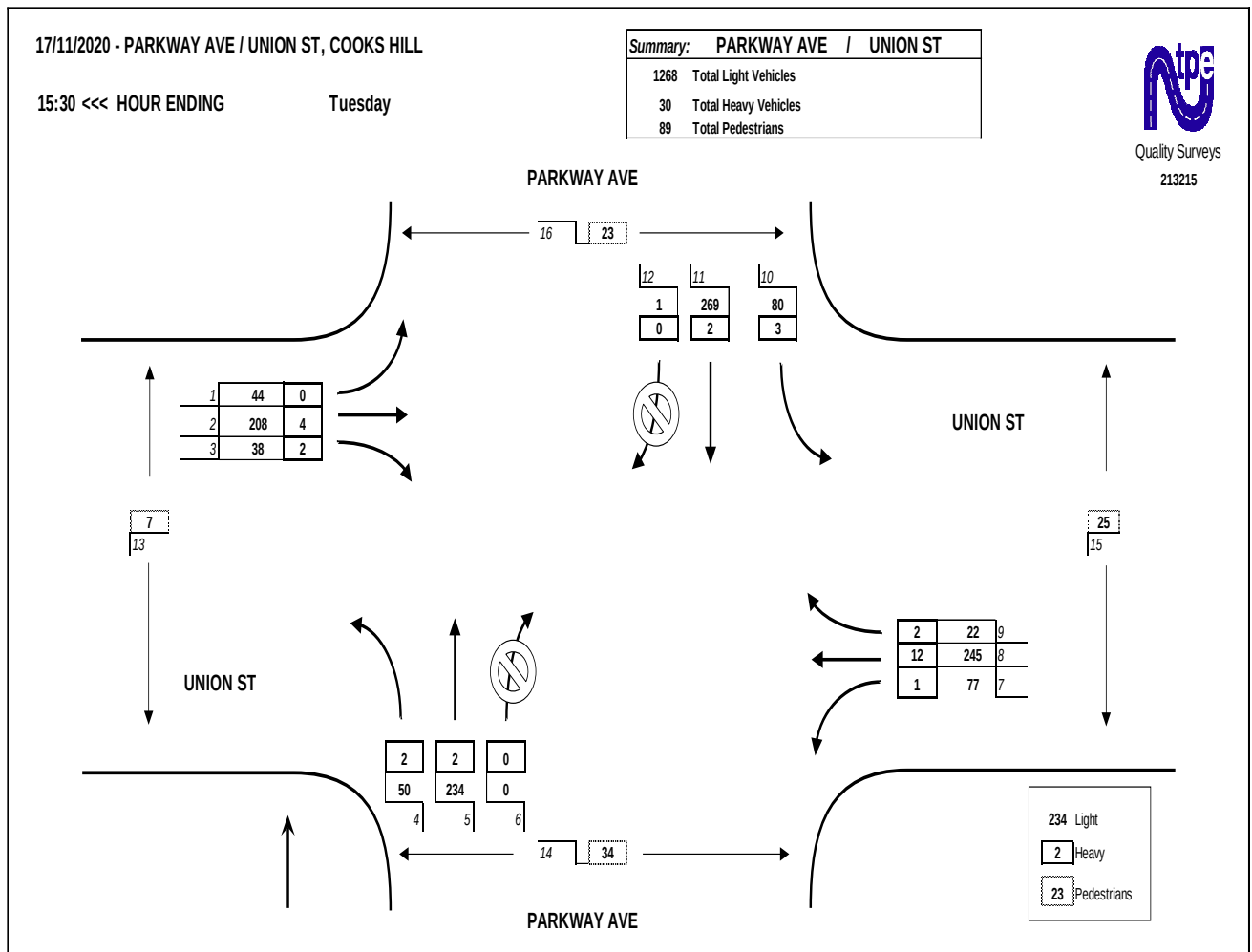
17/11/2020 - PARKWAY AVE / UNION ST, COOKS HILL

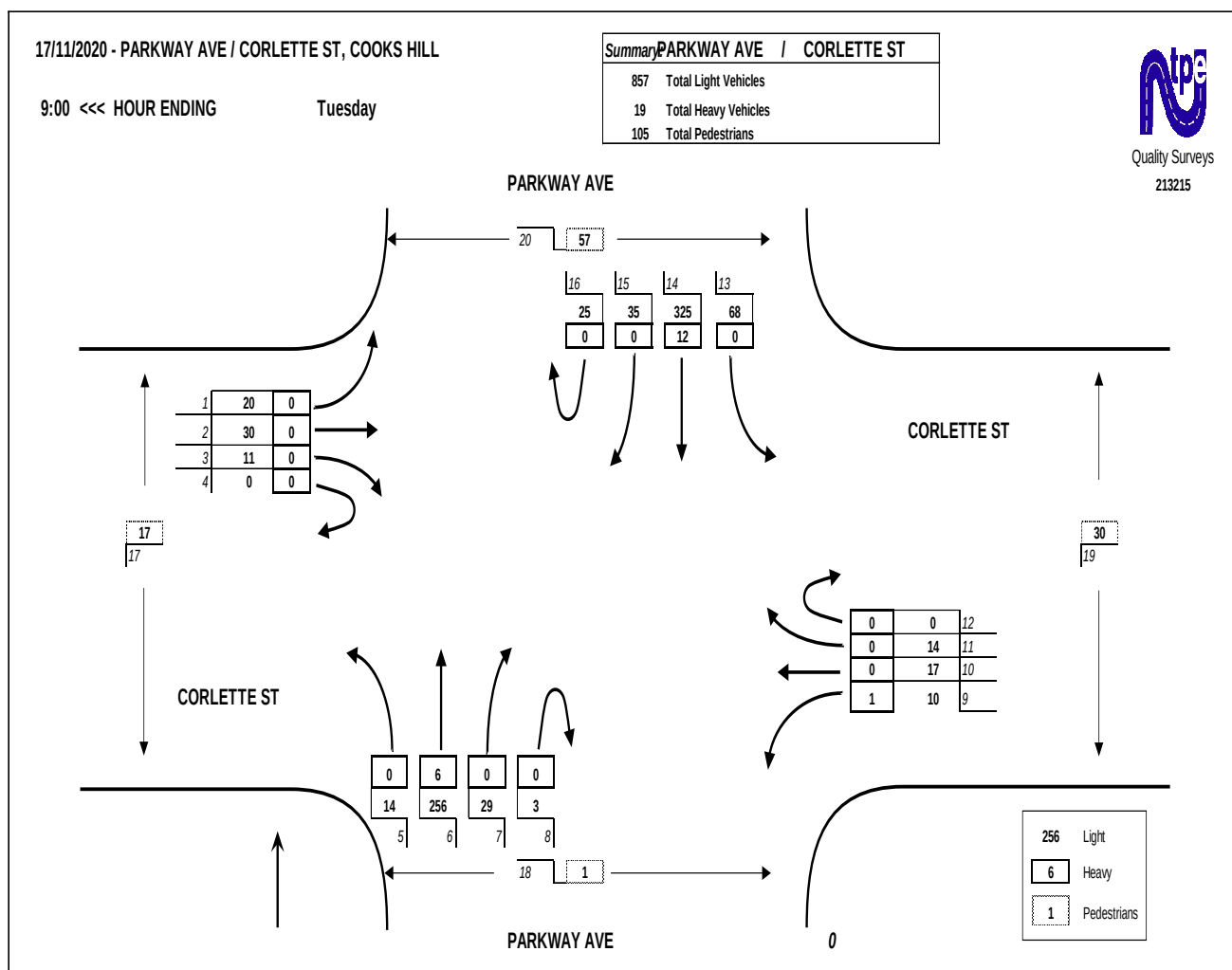
15:30 <<< HOUR ENDING

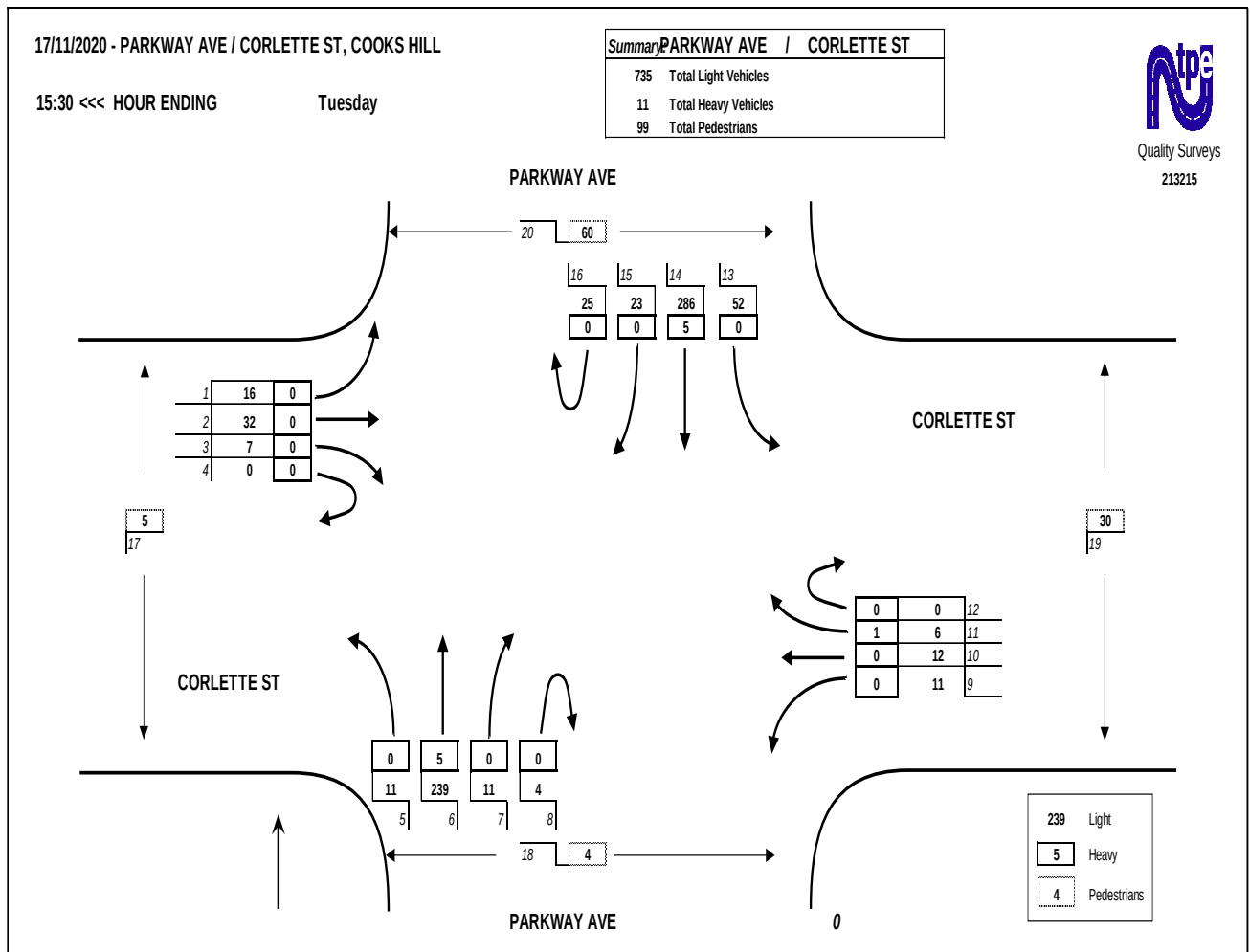
Tuesday

Summary: PARKWAY AVE / UNION ST	
1268	Total Light Vehicles
30	Total Heavy Vehicles
89	Total Pedestrians

npe
Quality Surveys
213215







ATTACHMENT D

SIDRA SUMMARY TABLES

MOVEMENT SUMMARY

Site: 101 [Union Street 2021AM (Site Folder: General)]

Network: N101 [2021AM (Network Folder: General)]

Union Street / Parkway Avenue traffic signals

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Practical Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total HV] veh/h	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Union Street														
1	L2	54	3.9	54	3.9	0.334	49.5	LOS D	1.4	10.4	0.98	0.75	0.98	32.6
2	T1	358	1.5	358	1.5	0.839	39.2	LOS C	11.5	82.3	0.98	0.98	1.18	36.3
3	R2	51	8.3	51	8.3	* 0.839	44.9	LOS D	11.5	82.3	0.98	0.98	1.18	26.2
Approach		462	2.5	462	2.5	0.839	41.0	LOS C	11.5	82.3	0.98	0.95	1.15	35.0
East: Parkway Avenue														
4	L2	41	7.7	41	7.7	0.057	14.7	LOS B	0.4	2.7	0.63	0.68	0.63	41.5
5	T1	296	0.0	296	0.0	0.708	35.3	LOS C	7.5	52.6	0.96	0.84	1.01	30.7
Approach		337	0.9	337	0.9	0.708	32.8	LOS C	7.5	52.6	0.92	0.82	0.97	31.7
North: Union Street														
7	L2	77	4.1	77	4.1	0.479	50.3	LOS D	2.1	15.2	0.99	0.76	0.99	22.9
8	T1	224	3.3	224	3.3	* 0.564	17.7	LOS B	3.4	24.3	0.93	0.77	0.93	46.3
9	R2	18	0.0	18	0.0	* 0.564	23.2	LOS B	3.4	24.3	0.93	0.77	0.93	45.3
Approach		319	3.3	319	3.3	0.564	25.8	LOS B	3.4	24.3	0.95	0.77	0.95	40.5
West: Parkway Avenue														
10	L2	156	4.1	156	4.1	0.185	21.3	LOS B	2.4	17.6	0.62	0.73	0.62	43.9
11	T1	349	1.2	349	1.2	* 0.886	47.1	LOS D	10.7	75.9	0.99	1.06	1.34	23.8
Approach		505	2.1	505	2.1	0.886	39.2	LOS C	10.7	75.9	0.88	0.96	1.12	30.3
All Vehicles		1623	2.2	1623	2.2	0.886	35.8	LOS C	11.5	82.3	0.93	0.89	1.06	34.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Union Street											
P1	Full	23	39.2	LOS D	0.1	0.1	0.93	0.93	204.8	215.2	1.05
East: Parkway Avenue											
P2	Full	14	16.9	LOS B	0.0	0.0	0.87	0.87	193.0	228.9	1.19
North: Union Street											
P3	Full	14	39.2	LOS D	0.0	0.0	0.93	0.93	204.8	215.2	1.05
West: Parkway Avenue											
P4	Full	38	39.3	LOS D	0.1	0.1	0.93	0.93	217.9	232.2	1.07

MOVEMENT SUMMARY

Site: 101 [Union Street 2021PM (Site Folder: General)]

Network: N101 [2021PM (Network Folder: General)]

Union Street / Parkway Avenue traffic signals

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Practical Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Union Street														
1	L2	46	0.0	46	0.0	0.181	39.6	LOS C	1.0	7.1	0.92	0.73	0.92	35.8
2	T1	223	1.9	223	1.9	0.765	36.2	LOS C	6.5	46.6	0.99	0.92	1.15	37.3
3	R2	42	5.0	42	5.0	* 0.765	41.8	LOS C	6.5	46.6	0.99	0.92	1.15	27.3
Approach		312	2.0	312	2.0	0.765	37.5	LOS C	6.5	46.6	0.98	0.89	1.12	36.1
East: Parkway Avenue														
4	L2	55	3.8	55	3.8	0.110	18.3	LOS B	0.5	3.9	0.78	0.71	0.78	39.1
5	T1	248	0.8	248	0.8	0.757	36.3	LOS C	6.0	42.6	0.99	0.90	1.14	30.3
Approach		303	1.4	303	1.4	0.757	33.0	LOS C	6.0	42.6	0.95	0.87	1.07	31.6
North: Union Street														
7	L2	82	1.3	82	1.3	0.324	40.6	LOS C	1.9	13.1	0.94	0.76	0.94	26.0
8	T1	271	4.7	271	4.7	* 0.528	13.4	LOS A	3.5	25.6	0.88	0.74	0.88	48.9
9	R2	25	8.3	25	8.3	* 0.528	19.1	LOS B	3.5	25.6	0.88	0.74	0.88	47.5
Approach		378	4.2	378	4.2	0.528	19.7	LOS B	3.5	25.6	0.89	0.75	0.89	44.0
West: Parkway Avenue														
10	L2	87	3.6	87	3.6	0.102	18.3	LOS B	1.1	8.3	0.58	0.70	0.58	45.3
11	T1	286	0.7	286	0.7	* 0.787	37.8	LOS C	7.2	50.8	1.00	0.94	1.18	27.0
Approach		374	1.4	374	1.4	0.787	33.2	LOS C	7.2	50.8	0.90	0.88	1.04	31.9
All Vehicles		1366	2.3	1366	2.3	0.787	30.4	LOS C	7.2	50.8	0.93	0.84	1.02	36.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Union Street											
P1	Full	7	34.2	LOS D	0.0	0.0	0.93	0.93	199.8	215.2	1.08
East: Parkway Avenue											
P2	Full	36	14.5	LOS B	0.0	0.0	0.85	0.85	190.6	228.9	1.20
North: Union Street											
P3	Full	26	34.3	LOS D	0.1	0.1	0.93	0.93	199.8	215.2	1.08
West: Parkway Avenue											
P4	Full	24	34.3	LOS D	0.1	0.1	0.93	0.93	212.9	232.2	1.09

MOVEMENT SUMMARY

Site: 101 [Union Street 2021AM + dev (Site Folder: General)]

Network: N101 [2021AM + dev (Network Folder: General)]

Union Street / Parkway Avenue traffic signals

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total HV] veh/h	%				[Veh. veh	Dist] m				
South: Union Street														
1	L2	54	3.9	54	3.9	0.210	39.4	LOS C	4.4	31.5	0.72	0.66	0.72	37.1
2	T1	358	1.5	358	1.5	0.905	61.1	LOS E	17.2	122.2	0.90	0.92	1.08	19.9
3	R2	94	2.2	94	2.2	* 0.905	76.2	LOS F	17.2	122.2	0.96	1.01	1.21	18.0
Approach		505	1.9	505	1.9	0.905	61.6	LOS E	17.2	122.2	0.89	0.91	1.07	21.4
East: Parkway Avenue														
4	L2	41	7.7	41	7.7	0.045	15.7	LOS B	0.5	4.0	0.51	0.67	0.51	40.8
5	T1	296	0.0	296	0.0	0.588	48.1	LOS D	11.1	77.5	0.90	0.77	0.90	26.1
Approach		337	0.9	337	0.9	0.588	44.1	LOS D	11.1	77.5	0.85	0.75	0.85	27.3
North: Union Street														
7	L2	203	1.6	203	1.6	0.415	30.4	LOS C	4.2	29.9	0.87	0.79	0.87	9.5
8	T1	257	2.9	257	2.9	* 0.744	45.0	LOS D	9.8	69.8	0.99	0.92	1.01	26.3
9	R2	59	0.0	59	0.0	* 0.744	50.1	LOS D	9.8	69.8	0.99	0.92	1.01	25.7
Approach		519	2.0	519	2.0	0.744	39.9	LOS C	9.8	69.8	0.94	0.87	0.96	22.5
West: Parkway Avenue														
10	L2	156	4.1	156	4.1	0.301	50.7	LOS D	5.4	39.2	0.83	0.78	0.83	22.9
11	T1	408	1.0	408	1.0	* 0.920	72.6	LOS F	20.1	142.0	0.97	1.05	1.23	18.0
Approach		564	1.9	564	1.9	0.920	66.5	LOS E	20.1	142.0	0.93	0.97	1.12	19.1
All Vehicles		1925	1.7	1925	1.7	0.920	54.1	LOS D	20.1	142.0	0.91	0.89	1.01	21.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Union Street											
P1	Full	23	69.2	LOS F	0.1	0.1	0.96	0.96	234.7	215.2	0.92
East: Parkway Avenue											
P2	Full	14	31.8	LOS D	0.0	0.0	0.92	0.92	207.9	228.9	1.10
North: Union Street											
P3	Full	14	69.2	LOS F	0.1	0.1	0.96	0.96	234.7	215.2	0.92
West: Parkway Avenue											
P4	Full	38	69.2	LOS F	0.2	0.2	0.96	0.96	247.8	232.2	0.94

MOVEMENT SUMMARY

Site: 101 [Union Street 2021PM + dev (Site Folder: General)] Network: N101 [2021PM+dev (Network Folder: General)]

Union Street / Parkway Avenue traffic signals

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total HV] veh/h	%				[Veh. veh	Dist] m				
South: Union Street														
1	L2	46	0.0	46	0.0	0.230	52.9	LOS D	3.9	27.2	0.84	0.71	0.84	32.5
2	T1	223	1.9	223	1.9	0.995	94.7	LOS F	13.4	95.5	0.95	1.05	1.38	14.6
3	R2	65	3.2	65	3.2	* 0.995	118.8	LOS F	13.4	95.5	1.00	1.19	1.60	12.7
Approach		335	1.9	335	1.9	0.995	93.7	LOS F	13.4	95.5	0.95	1.03	1.35	16.3
East: Parkway Avenue														
4	L2	55	3.8	55	3.8	0.101	26.7	LOS B	0.9	6.6	0.75	0.72	0.75	34.1
5	T1	248	0.8	248	0.8	0.832	69.2	LOS E	11.3	79.9	1.00	0.94	1.16	20.9
Approach		303	1.4	303	1.4	0.832	61.5	LOS E	11.3	79.9	0.95	0.90	1.09	22.5
North: Union Street														
7	L2	209	0.5	209	0.5	0.485	58.6	LOS E	8.1	57.0	0.92	0.81	0.92	5.4
8	T1	312	4.1	311	4.1	* 0.815	37.1	LOS C	11.1	80.0	0.93	0.89	1.01	29.1
9	R2	74	2.9	74	2.9	* 0.815	42.3	LOS C	11.1	80.0	0.93	0.89	1.01	28.3
Approach		595	2.7	594 ^{N1}	2.7	0.815	45.3	LOS D	11.1	80.0	0.92	0.86	0.98	21.4
West: Parkway Avenue														
10	L2	87	3.6	87	3.6	0.099	27.6	LOS B	2.1	14.9	0.57	0.71	0.57	31.9
11	T1	317	0.7	317	0.7	* 1.040	137.7	LOS F	21.5	151.0	1.00	1.32	1.69	10.9
Approach		404	1.3	404	1.3	1.040	113.9	LOS F	21.5	151.0	0.91	1.18	1.45	12.7
All Vehicles		1637	1.9	1636 ^{N1}	1.9	1.040	75.1	LOS F	21.5	151.0	0.93	0.98	1.19	17.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m				sec	m m/sec
South: Union Street											
P1	Full	7	69.1	LOS F	0.0	0.0	0.96	0.96	234.7	215.2	0.92
East: Parkway Avenue											
P2	Full	36	31.8	LOS D	0.1	0.1	0.92	0.92	207.9	228.9	1.10
North: Union Street											
P3	Full	26	69.2	LOS F	0.1	0.1	0.96	0.96	234.7	215.2	0.92
West: Parkway Avenue											
P4	Full	24	69.2	LOS F	0.1	0.1	0.96	0.96	247.8	232.2	0.94

MOVEMENT SUMMARY

Site: 101 [Union Street 2031AM - 30 min peak (Site Folder: General)]

Network: N101 [2031 AM (Network Folder: General)]

Union Street / Parkway Avenue traffic signals

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total HV] veh/h	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Union Street														
1	L2	62	3.9	62	3.9	0.345	75.1	LOS F ¹¹	2.7	19.3	0.97	0.76	0.97	26.5
2	T1	415	1.5	415	1.5	0.906	67.1	LOS E ¹¹	22.9	163.5	0.99	1.02	1.19	28.4
3	R2	59	8.3	59	8.3	*0.906	72.7	LOS F ¹¹	22.9	163.5	0.99	1.02	1.19	18.8
Approach		536	2.5	536	2.5	0.906	68.6	LOS E ¹¹	22.9	163.5	0.99	0.99	1.16	27.4
East: Parkway Avenue														
4	L2	48	7.7	48	7.7	0.051	15.3	LOS B	0.6	4.3	0.51	0.67	0.51	41.1
5	T1	343	0.0	343	0.0	0.671	48.6	LOS D ¹¹	13.1	91.8	0.92	0.79	0.92	25.9
Approach		391	0.9	391	0.9	0.671	44.5	LOS D ¹¹	13.1	91.8	0.87	0.78	0.87	27.2
North: Union Street														
7	L2	89	4.1	89	4.1	0.494	76.4	LOS F ¹¹	3.9	28.2	0.99	0.78	0.99	17.3
8	T1	260	3.3	260	3.3	*0.626	28.6	LOS C	6.3	45.3	0.95	0.80	0.95	40.7
9	R2	21	0.0	21	0.0	*0.626	34.1	LOS C	6.3	45.3	0.95	0.80	0.95	39.9
Approach		370	3.3	370	3.3	0.626	40.4	LOS C	6.3	45.3	0.96	0.79	0.96	34.2
West: Parkway Avenue														
10	L2	181	4.1	181	4.1	0.198	27.8	LOS B	4.3	31.5	0.58	0.73	0.58	40.7
11	T1	406	1.2	406	1.2	*0.929	74.8	LOS F ¹¹	20.2	143.1	0.96	1.06	1.25	17.6
Approach		586	2.1	586	2.1	0.929	60.3	LOS E ¹¹	20.2	143.1	0.84	0.96	1.04	23.9
All Vehicles		1884	2.2	1884	2.2	0.929	55.5	LOS D ¹¹	22.9	163.5	0.91	0.90	1.02	27.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

¹¹ Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Union Street											
P1	Full	28	69.2	LOS F ¹²	0.1	0.1	0.96	0.96	234.7	215.2	0.92
East: Parkway Avenue											
P2	Full	17	31.8	LOS D	0.0	0.0	0.92	0.92	207.8	228.9	1.10
North: Union Street											
P3	Full	17	69.2	LOS F ¹²	0.1	0.1	0.96	0.96	234.7	215.2	0.92
West: Parkway Avenue											

MOVEMENT SUMMARY

Site: 101 [Union Street 2031 AM + dev (Site Folder: General)]

Network: N101 [2031AM + dev (Network Folder: General)]

Union Street / Parkway Avenue traffic signals

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Union Street														
1	L2	62	3.9	62	3.9	0.239	41.6	LOS C	4.5	31.9	0.74	0.68	0.74	36.1
2	T1	415	1.5	415	1.5	* 1.033	112.4	LOS F ¹¹	30.4	215.6	0.95	1.19	1.45	12.7
3	R2	109	2.2	109	2.2	1.033	136.7	LOS F ¹¹	30.4	215.6	1.00	1.31	1.62	11.2
Approach		586	1.9	586	1.9	1.033	109.4	LOS F ¹¹	30.4	215.6	0.94	1.16	1.41	14.1
East: Parkway Avenue														
4	L2	48	7.7	48	7.7	0.050	15.2	LOS B	0.6	4.7	0.49	0.67	0.49	41.2
5	T1	343	0.0	343	0.0	0.656	47.6	LOS D ¹¹	13.0	90.9	0.91	0.78	0.91	26.2
Approach		391	0.9	391	0.9	0.656	43.7	LOS D ¹¹	13.0	90.9	0.86	0.77	0.86	27.4
North: Union Street														
7	L2	236	1.6	236	1.6	0.534	36.3	LOS C	5.2	37.2	0.92	0.83	0.92	8.2
8	T1	298	2.9	298	2.9	0.870	61.3	LOS E ¹¹	11.2	80.0	1.00	1.06	1.17	21.9
9	R2	68	0.0	68	0.0	* 0.870	66.5	LOS E ¹¹	11.2	80.0	1.00	1.06	1.17	21.5
Approach		602	2.0	602	2.0	0.870	52.1	LOS D ¹¹	11.2	80.0	0.97	0.97	1.07	18.9
West: Parkway Avenue														
10	L2	181	4.1	181	4.1	0.334	49.8	LOS D ¹¹	6.3	45.3	0.82	0.79	0.82	23.2
11	T1	474	1.0	474	1.0	* 1.038	132.7	LOS F ¹¹	32.9	232.4	1.00	1.38	1.63	11.2
Approach		655	1.9	655	1.9	1.038	109.8	LOS F ¹¹	32.9	232.4	0.95	1.21	1.41	13.1
All Vehicles		2234	1.7	2234	1.7	1.038	82.6	LOS F ¹¹	32.9	232.4	0.94	1.06	1.22	16.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

¹¹ Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped]	[Dist m]			sec	m	m/sec
South: Union Street											
P1	Full	28	69.2	LOS F ¹²	0.1	0.1	0.96	0.96	234.7	215.2	0.92
East: Parkway Avenue											
P2	Full	17	32.0	LOS D	0.0	0.0	0.92	0.92	208.1	228.9	1.10
North: Union Street											
P3	Full	17	69.2	LOS F ¹²	0.1	0.1	0.96	0.96	234.7	215.2	0.92
West: Parkway Avenue											

MOVEMENT SUMMARY

Site: 101 [Union Street 2031PM - 30 min peak (Site Folder: General)]

Network: N101 [2031 PM (Network Folder: General)]

Union Street / Parkway Avenue traffic signals

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Practical Cycle Time)

Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total HV] veh/h	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Union Street														
1	L2	54	0.0	54	0.0	0.204	48.2	LOS D ¹¹	1.8	12.8	0.90	0.74	0.90	33.3
2	T1	259	1.9	259	1.9	0.882	56.5	LOS E ¹¹	10.9	78.1	1.00	1.02	1.29	30.9
3	R2	49	5.0	49	5.0	* 0.882	62.6	LOS E ¹¹	10.9	78.1	1.00	1.03	1.31	20.9
Approach		362	2.0	362	2.0	0.882	56.1	LOS D ¹¹	10.9	78.1	0.98	0.98	1.23	30.2
East: Parkway Avenue														
4	L2	64	3.8	64	3.8	0.104	19.9	LOS B	0.8	5.6	0.72	0.71	0.72	38.1
5	T1	288	0.8	288	0.8	0.788	46.8	LOS D ¹¹	9.4	66.0	0.98	0.90	1.10	26.5
Approach		352	1.4	352	1.4	0.788	41.9	LOS C	9.4	66.0	0.93	0.87	1.03	28.0
North: Union Street														
7	L2	95	1.3	95	1.3	0.316	50.1	LOS D ¹¹	2.8	20.0	0.92	0.77	0.92	22.9
8	T1	314	4.7	314	4.7	* 0.572	17.3	LOS B	5.4	39.3	0.88	0.76	0.88	46.5
9	R2	29	8.3	29	8.3	* 0.572	23.0	LOS B	5.4	39.3	0.88	0.76	0.88	45.2
Approach		439	4.2	439	4.2	0.572	24.8	LOS B	5.4	39.3	0.89	0.76	0.89	41.1
West: Parkway Avenue														
10	L2	101	3.6	101	3.6	0.112	21.4	LOS B	1.7	12.5	0.56	0.71	0.56	43.6
11	T1	332	0.7	332	0.7	* 0.884	55.8	LOS D ¹¹	12.1	85.5	1.00	1.04	1.29	21.4
Approach		434	1.4	434	1.4	0.884	47.8	LOS D ¹¹	12.1	85.5	0.90	0.96	1.12	26.5
All Vehicles		1586	2.3	1586	2.3	0.884	42.0	LOS C	12.1	85.5	0.92	0.89	1.06	31.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

¹¹ Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Union Street											
P1	Full	9	49.2	LOS E ¹²	0.0	0.0	0.95	0.95	214.7	215.2	1.00
East: Parkway Avenue											
P2	Full	44	21.9	LOS C	0.1	0.1	0.89	0.89	198.0	228.9	1.16
North: Union Street											
P3	Full	32	49.2	LOS E ¹²	0.1	0.1	0.95	0.95	214.8	215.2	1.00
West: Parkway Avenue											

MOVEMENT SUMMARY

Site: 101 [Union Street 2031PM + dev (Site Folder: General)]

Network: N101 [2031PM + dev (Network Folder: General)]

Union Street / Parkway Avenue traffic signals

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total HV] veh/h	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Union Street														
1	L2	54	0.0	54	0.0	0.253	59.1	LOS E ¹¹	3.6	25.7	0.88	0.74	0.88	30.7
2	T1	259	1.9	259	1.9	1.093	155.5	LOS F ¹¹	22.4	159.8	0.98	1.31	1.74	9.6
3	R2	76	3.2	76	3.2	* 1.093	181.6	LOS F ¹¹	22.4	159.8	1.00	1.43	1.91	8.7
Approach		388	1.9	388	1.9	1.093	147.3	LOS F ¹¹	22.4	159.8	0.97	1.26	1.66	11.3
East: Parkway Avenue														
4	L2	64	3.8	64	3.8	0.108	25.5	LOS B	1.1	8.0	0.73	0.72	0.73	34.8
5	T1	288	0.8	288	0.8	0.907	78.2	LOS F ¹¹	14.2	100.0	1.00	1.04	1.29	19.3
Approach		352	1.4	352	1.4	0.907	68.7	LOS E ¹¹	14.2	100.0	0.95	0.98	1.19	20.9
North: Union Street														
7	L2	243	0.5	242	0.5	0.975	107.2	LOS F ¹¹	11.4	80.0	0.98	1.05	1.51	3.0
8	T1	362	4.1	360	4.1	* 0.916	56.2	LOS D ¹¹	11.1	80.0	0.95	1.04	1.19	23.1
9	R2	86	2.9	85	2.9	* 0.916	61.3	LOS E ¹¹	11.1	80.0	0.95	1.04	1.19	22.6
Approach		690	2.7	687 ^{N1}	2.7	0.975	74.8	LOS F ¹¹	11.4	80.0	0.96	1.04	1.30	15.1
West: Parkway Avenue														
10	L2	101	3.6	101	3.6	0.109	25.7	LOS B	2.3	16.5	0.54	0.71	0.54	33.0
11	T1	368	0.7	368	0.7	* 1.132	203.8	LOS F ¹¹	30.7	216.0	1.00	1.57	2.03	7.7
Approach		469	1.3	469	1.3	1.132	165.3	LOS F ¹¹	30.7	216.0	0.90	1.38	1.71	9.2
All Vehicles		1900	1.9	1897 ^{N1}	1.9	1.132	110.9	LOS F ¹¹	30.7	216.0	0.95	1.16	1.45	12.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

¹¹ Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

* Critical Movement (Signal Timing)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Union Street											
P1	Full	9	69.1	LOS F ¹²	0.0	0.0	0.96	0.96	234.7	215.2	0.92
East: Parkway Avenue											
P2	Full	44	31.8	LOS D	0.1	0.1	0.92	0.92	207.9	228.9	1.10
North: Union Street											
P3	Full	32	69.2	LOS F ¹²	0.1	0.1	0.96	0.96	234.8	215.2	0.92

MOVEMENT SUMMARY

Site: 101 [Corlette 2021AM (Site Folder: General)]

Network: N101 [2021AM (Network Folder: General)]

Parkway Avenue / Corlette Street, Cooks Hill

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Corlette Street														
1	L2	12	9.1	12	9.1	0.086	10.2	LOS A	0.1	0.8	0.55	0.98	0.55	43.6
2	T1	18	0.0	18	0.0	0.086	13.1	LOS A	0.1	0.8	0.55	0.98	0.55	28.9
3	R2	15	0.0	15	0.0	0.086	14.6	LOS B	0.1	0.8	0.55	0.98	0.55	48.8
Approach		44	2.4	44	2.4	0.086	12.8	LOS A	0.1	0.8	0.55	0.98	0.55	38.9
East: Parkway Avenue														
4	L2	72	0.0	72	0.0	0.270	6.4	LOS A	0.4	2.8	0.19	0.15	0.19	56.2
5	T1	355	3.6	355	3.6	0.270	0.4	LOS A	0.4	2.8	0.19	0.15	0.19	55.7
6	R2	63	0.0	63	0.0	0.270	6.8	LOS A	0.4	2.8	0.19	0.15	0.19	33.0
Approach		489	2.6	489	2.6	0.270	2.1	NA	0.4	2.8	0.19	0.15	0.19	51.3
North: Corlette Street														
7	L2	21	0.0	21	0.0	0.112	8.8	LOS A	0.2	1.2	0.48	0.96	0.48	44.4
8	T1	32	0.0	32	0.0	0.112	13.3	LOS A	0.2	1.2	0.48	0.96	0.48	44.0
9	R2	12	0.0	12	0.0	0.112	13.5	LOS A	0.2	1.2	0.48	0.96	0.48	20.3
Approach		64	0.0	64	0.0	0.112	11.9	LOS A	0.2	1.2	0.48	0.96	0.48	42.5
West: Parkway Avenue														
10	L2	15	0.0	15	0.0	0.181	7.1	LOS A	0.1	1.0	0.12	0.09	0.12	15.1
11	T1	276	2.3	276	2.3	0.181	0.3	LOS A	0.1	1.0	0.12	0.09	0.12	57.8
12	R2	34	0.0	34	0.0	0.181	7.4	LOS A	0.1	1.0	0.12	0.09	0.12	54.4
Approach		324	1.9	324	1.9	0.181	1.4	NA	0.1	1.0	0.12	0.09	0.12	55.1
All Vehicles		922	2.2	922	2.2	0.270	3.0	NA	0.4	2.8	0.20	0.23	0.20	51.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101 [Corlette 2021AM +dev (Site Folder: General)]

Network: N101 [2021AM + dev (Network Folder: General)]

Parkway Avenue / Corlette Street, Cooks Hill
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total HV] veh/h	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Corlette Street														
1	L2	12	9.1	12	9.1	0.139	10.2	LOS A	0.2	1.3	0.65	0.99	0.65	41.3
2	T1	25	0.0	25	0.0	0.139	16.9	LOS B	0.2	1.3	0.65	0.99	0.65	41.3
3	R2	15	0.0	15	0.0	0.139	16.6	LOS B	0.2	1.3	0.65	0.99	0.65	47.3
Approach		52	2.0	52	2.0	0.139	15.3	LOS B	0.2	1.3	0.65	0.99	0.65	43.8
East: Parkway Avenue														
4	L2	72	0.0	72	0.0	0.404	8.3	LOS A	1.0	6.8	0.41	0.20	0.48	54.8
5	T1	355	3.6	355	3.6	0.404	1.6	LOS A	1.0	6.8	0.41	0.20	0.48	53.0
6	R2	117	0.0	117	0.0	0.404	8.7	LOS A	1.0	6.8	0.41	0.20	0.48	53.0
Approach		543	2.3	543	2.3	0.404	4.0	NA	1.0	6.8	0.41	0.20	0.48	53.4
North: Corlette Street														
7	L2	21	0.0	21	0.0	0.149	9.1	LOS A	0.2	1.4	0.55	0.96	0.55	42.8
8	T1	32	0.0	32	0.0	0.149	16.0	LOS B	0.2	1.4	0.55	0.96	0.55	42.4
9	R2	12	0.0	12	0.0	0.149	16.6	LOS B	0.2	1.4	0.55	0.96	0.55	18.2
Approach		64	0.0	64	0.0	0.149	13.8	LOS A	0.2	1.4	0.55	0.96	0.55	40.8
West: Parkway Avenue														
10	L2	185	0.0	185	0.0	0.306	6.1	LOS A	0.2	1.7	0.13	0.22	0.13	41.8
11	T1	326	1.9	326	1.9	0.306	0.4	LOS A	0.2	1.7	0.13	0.22	0.13	55.6
12	R2	43	0.0	43	0.0	0.306	7.8	LOS A	0.2	1.7	0.13	0.22	0.13	52.4
Approach		555	1.1	555	1.1	0.306	2.9	NA	0.2	1.7	0.13	0.22	0.13	53.7
All Vehicles		1214	1.6	1214	1.6	0.404	4.5	NA	1.0	6.8	0.30	0.29	0.33	52.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Work Documents\Projects\2020_027 - NGS Park Campus\Union Parkway Corlette.sip9

MOVEMENT SUMMARY

Site: 101 [Corlette 2031AM - 30 minute peak (Site Folder: General)]

Network: N101 [2031 AM (Network Folder: General)]

Parkway Avenue / Corlette Street, Cooks Hill

Site Category: (None)

Stop (Two-Way)

Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total HV] veh/h	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Corlette Street														
1	L2	13	9.1	13	9.1	0.136	10.6	LOS A	0.2	1.1	0.61	0.99	0.61	42.4
2	T1	21	0.0	21	0.0	0.136	14.5	LOS A	0.2	1.1	0.61	0.99	0.61	48.2
3	R2	17	0.0	17	0.0	0.136	16.5	LOS B	0.2	1.1	0.61	0.99	0.61	48.0
Approach		51	2.4	51	2.4	0.136	14.1	LOS A	0.2	1.1	0.61	0.99	0.61	47.2
East: Parkway Avenue														
4	L2	13	9.1	13	9.1	0.453	7.4	LOS A	0.5	3.6	0.22	0.12	0.24	56.1
5	T1	412	3.6	412	3.6	0.453	0.6	LOS A	0.5	3.6	0.22	0.12	0.24	56.3
6	R2	83	0.0	83	0.0	0.453	7.3	LOS A	0.5	3.6	0.22	0.12	0.24	55.9
Approach		508	3.1	508	3.1	0.453	1.9	NA	0.5	3.6	0.22	0.12	0.24	56.2
North: Corlette Street														
7	L2	24	0.0	24	0.0	0.164	9.4	LOS A	0.2	1.5	0.53	0.96	0.53	48.9
8	T1	37	0.0	37	0.0	0.164	14.7	LOS B	0.2	1.5	0.53	0.96	0.53	48.7
9	R2	13	0.0	13	0.0	0.164	16.3	LOS B	0.2	1.5	0.53	0.96	0.53	43.0
Approach		75	0.0	75	0.0	0.164	13.3	LOS A	0.2	1.5	0.53	0.96	0.53	48.1
West: Parkway Avenue														
10	L2	17	0.0	17	0.0	0.210	7.2	LOS A	0.2	1.1	0.13	0.09	0.13	55.3
11	T1	320	2.3	320	2.3	0.210	0.4	LOS A	0.2	1.1	0.13	0.09	0.13	57.8
12	R2	39	0.0	39	0.0	0.210	7.5	LOS A	0.2	1.1	0.13	0.09	0.13	54.4
Approach		376	1.9	376	1.9	0.210	1.4	NA	0.2	1.1	0.13	0.09	0.13	57.3
All Vehicles		1010	2.4	1010	2.4	0.453	3.2	NA	0.5	3.6	0.23	0.21	0.24	54.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101 [Corlette 2031AM +dev (Site Folder: General)]

Network: N101 [2031AM + dev (Network Folder: General)]

Parkway Avenue / Corlette Street, Cooks Hill
Site Category: (None)
Stop (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total HV] veh/h	%				[Veh. veh	Dist] m				
South: Corlette Street														
1	L2	13	9.1	13	9.1	0.244	11.4	LOS A	0.3	2.2	0.74	1.02	0.82	38.3
2	T1	38	0.0	38	0.0	0.244	21.0	LOS B	0.3	2.2	0.74	1.02	0.82	38.3
3	R2	17	0.0	17	0.0	0.244	20.6	LOS B	0.3	2.2	0.74	1.02	0.82	45.3
Approach		68	1.8	68	1.8	0.244	19.0	LOS B	0.3	2.2	0.74	1.02	0.82	40.8
East: Parkway Avenue														
4	L2	83	0.0	83	0.0	0.565	10.0	LOS A	1.7	12.4	0.46	0.23	0.73	53.5
5	T1	412	3.6	412	3.6	0.565	3.1	LOS A	1.7	12.4	0.46	0.23	0.73	50.7
6	R2	136	0.0	136	0.0	0.565	10.6	LOS A	1.7	12.4	0.46	0.23	0.73	50.7
Approach		630	2.3	630	2.3	0.565	5.6	NA	1.7	12.4	0.46	0.23	0.73	51.3
North: Corlette Street														
7	L2	24	0.0	24	0.0	0.225	9.6	LOS A	0.3	2.0	0.63	0.97	0.66	40.8
8	T1	37	0.0	37	0.0	0.225	19.5	LOS B	0.3	2.0	0.63	0.97	0.66	40.5
9	R2	13	0.0	13	0.0	0.225	20.3	LOS B	0.3	2.0	0.63	0.97	0.66	16.1
Approach		75	0.0	75	0.0	0.225	16.4	LOS B	0.3	2.0	0.63	0.97	0.66	38.7
West: Parkway Avenue														
10	L2	215	0.0	210	0.0	0.350	6.4	LOS A	0.4	2.5	0.16	0.22	0.18	40.7
11	T1	379	1.9	369	1.9	0.350	0.6	LOS A	0.4	2.5	0.16	0.22	0.18	55.2
12	R2	50	0.0	49	0.0	0.350	8.5	LOS A	0.4	2.5	0.16	0.22	0.18	52.1
Approach		644	1.1	627 ^{N1}	1.1	0.350	3.2	NA	0.4	2.5	0.16	0.22	0.18	53.3
All Vehicles		1417	1.6	1401 ^{N1}	1.7	0.565	5.7	NA	1.7	12.4	0.35	0.30	0.49	50.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Corlette 2021PM (Site Folder: General)]

Network: N101 [2021PM (Network Folder: General)]

Parkway Avenue / Corlette Street, Cooks Hill

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Corlette Street														
1	L2	12	0.0	12	0.0	0.051	9.3	LOSA	0.1	0.5	0.49	0.93	0.49	44.9
2	T1	13	0.0	13	0.0	0.051	11.8	LOSA	0.1	0.5	0.49	0.93	0.49	49.9
3	R2	7	14.3	7	14.3	0.051	14.4	LOSA	0.1	0.5	0.49	0.93	0.49	49.1
Approach		32	3.3	32	3.3	0.051	11.5	LOSA	0.1	0.5	0.49	0.93	0.49	48.4
East: Parkway Avenue														
4	L2	55	0.0	55	0.0	0.224	6.3	LOSA	0.3	2.1	0.17	0.14	0.17	56.4
5	T1	306	1.7	306	1.7	0.224	0.3	LOSA	0.3	2.1	0.17	0.14	0.17	56.1
6	R2	51	0.0	51	0.0	0.224	6.7	LOSA	0.3	2.1	0.17	0.14	0.17	55.8
Approach		412	1.3	412	1.3	0.224	1.9	NA	0.3	2.1	0.17	0.14	0.17	56.1
North: Corlette Street														
7	L2	17	0.0	17	0.0	0.089	9.1	LOSA	0.1	0.9	0.45	0.96	0.45	50.1
8	T1	34	0.0	34	0.0	0.089	12.2	LOSA	0.1	0.9	0.45	0.96	0.45	49.8
9	R2	7	0.0	7	0.0	0.089	12.4	LOSA	0.1	0.9	0.45	0.96	0.45	44.9
Approach		58	0.0	58	0.0	0.089	11.3	LOSA	0.1	0.9	0.45	0.96	0.45	49.6
West: Parkway Avenue														
10	L2	17	0.0	17	0.0	0.152	6.3	LOSA	0.0	0.3	0.04	0.06	0.04	56.2
11	T1	257	2.0	257	2.0	0.152	0.1	LOSA	0.0	0.3	0.04	0.06	0.04	58.8
12	R2	12	0.0	12	0.0	0.152	6.9	LOSA	0.0	0.3	0.04	0.06	0.04	55.3
Approach		285	1.8	285	1.8	0.152	0.7	NA	0.0	0.3	0.04	0.06	0.04	58.5
All Vehicles		786	1.5	786	1.5	0.224	2.5	NA	0.3	2.1	0.16	0.20	0.16	55.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101 [Corlette 2021PM + dev (Site Folder: General)]

Network: N101 [2021PM+dev (Network Folder: General)]

Parkway Avenue / Corlette Street, Cooks Hill

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total HV] veh/h	%				[Veh. veh	Dist] m				
South: Corlette Street														
1	L2	12	0.0	12	0.0	0.084	9.3	LOSA	0.1	0.7	0.54	0.97	0.54	43.6
2	T1	20	0.0	20	0.0	0.084	13.8	LOSA	0.1	0.7	0.54	0.97	0.54	43.6
3	R2	7	14.3	7	14.3	0.084	16.0	LOS B	0.1	0.7	0.54	0.97	0.54	48.2
Approach		39	2.7	39	2.7	0.084	12.9	LOSA	0.1	0.7	0.54	0.97	0.54	45.0
East: Parkway Avenue														
4	L2	55	0.0	55	0.0	0.327	7.3	LOSA	0.5	3.5	0.31	0.17	0.31	55.7
5	T1	306	1.7	306	1.7	0.327	0.8	LOSA	0.5	3.5	0.31	0.17	0.31	54.6
6	R2	81	0.0	81	0.0	0.327	7.7	LOSA	0.5	3.5	0.31	0.17	0.31	54.6
Approach		442	1.2	442	1.2	0.327	2.9	NA	0.5	3.5	0.31	0.17	0.31	54.8
North: Corlette Street														
7	L2	17	0.0	17	0.0	0.109	9.0	LOSA	0.2	1.1	0.52	0.97	0.52	44.2
8	T1	34	0.0	34	0.0	0.109	13.3	LOSA	0.2	1.1	0.52	0.97	0.52	43.9
9	R2	7	0.0	7	0.0	0.109	13.8	LOSA	0.2	1.1	0.52	0.97	0.52	20.1
Approach		58	0.0	58	0.0	0.109	12.1	LOSA	0.2	1.1	0.52	0.97	0.52	42.9
West: Parkway Avenue														
10	L2	119	0.0	116	0.0	0.244	5.8	LOSA	0.1	0.6	0.05	0.17	0.05	46.8
11	T1	328	1.6	322	1.6	0.244	0.1	LOSA	0.1	0.6	0.05	0.17	0.05	57.1
12	R2	19	0.0	19	0.0	0.244	7.1	LOSA	0.1	0.6	0.05	0.17	0.05	53.7
Approach		466	1.1	457 ^{N1}	1.1	0.244	1.9	NA	0.1	0.6	0.05	0.17	0.05	56.2
All Vehicles		1005	1.2	996 ^{N1}	1.2	0.327	3.3	NA	0.5	3.5	0.21	0.25	0.21	54.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: 101 [Corlette 2031PM - 30 min peak (Site Folder: General)]

Network: N101 [2031 PM (Network Folder: General)]

Parkway Avenue / Corlette Street, Cooks Hill

Site Category: (None)

Stop (Two-Way)

Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total HV] veh/h	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Corlette Street														
1	L2	13	0.0	13	0.0	0.071	9.6	LOSA	0.1	0.7	0.54	0.96	0.54	43.9
2	T1	15	0.0	15	0.0	0.071	12.9	LOSA	0.1	0.7	0.54	0.96	0.54	49.2
3	R2	9	14.3	9	14.3	0.071	16.3	LOS B	0.1	0.7	0.54	0.96	0.54	48.5
Approach		37	3.3	37	3.3	0.071	12.5	LOSA	0.1	0.7	0.54	0.96	0.54	47.7
East: Parkway Avenue														
4	L2	64	0.0	64	0.0	0.288	6.5	LOSA	0.4	2.6	0.19	0.14	0.19	56.3
5	T1	355	1.7	355	1.7	0.288	0.4	LOSA	0.4	2.6	0.19	0.14	0.19	55.9
6	R2	59	0.0	59	0.0	0.288	7.0	LOSA	0.4	2.6	0.19	0.14	0.19	55.8
Approach		478	1.3	478	1.3	0.288	2.0	NA	0.4	2.6	0.19	0.14	0.19	56.0
North: Corlette Street														
7	L2	20	0.0	20	0.0	0.119	9.3	LOSA	0.2	1.2	0.50	0.97	0.50	49.5
8	T1	39	0.0	39	0.0	0.119	13.5	LOSA	0.2	1.2	0.50	0.97	0.50	49.2
9	R2	9	0.0	9	0.0	0.119	13.9	LOSA	0.2	1.2	0.50	0.97	0.50	43.9
Approach		67	0.0	67	0.0	0.119	12.4	LOSA	0.2	1.2	0.50	0.97	0.50	48.9
West: Parkway Avenue														
10	L2	20	0.0	20	0.0	0.177	6.5	LOSA	0.1	0.4	0.05	0.06	0.05	56.2
11	T1	298	2.0	298	2.0	0.177	0.1	LOSA	0.1	0.4	0.05	0.06	0.05	58.7
12	R2	13	0.0	13	0.0	0.177	7.3	LOSA	0.1	0.4	0.05	0.06	0.05	55.2
Approach		331	1.8	331	1.8	0.177	0.8	NA	0.1	0.4	0.05	0.06	0.05	58.4
All Vehicles		913	1.5	913	1.5	0.288	2.7	NA	0.4	2.6	0.18	0.20	0.18	55.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101 [Corlette 2031PM + dev (Site Folder: General)]

Network: N101 [2031PM + dev (Network Folder: General)]

Parkway Avenue / Corlette Street, Cooks Hill

Site Category: (None)

Stop (Two-Way)

Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total HV] veh/h	%				[Veh. veh	Dist] m				
South: Corlette Street														
1	L2	13	0.0	13	0.0	0.129	9.6	LOS A	0.1	1.0	0.59	0.98	0.59	42.4
2	T1	23	0.0	23	0.0	0.129	15.3	LOS B	0.1	1.0	0.59	0.98	0.59	42.4
3	R2	9	14.3	9	14.3	0.129	18.2	LOS B	0.1	1.0	0.59	0.98	0.59	47.5
Approach		45	2.7	45	2.7	0.129	14.2	LOS A	0.1	1.0	0.59	0.98	0.59	43.9
East: Parkway Avenue														
4	L2	64	0.0	64	0.0	0.299	7.7	LOS A	0.6	4.5	0.34	0.17	0.34	55.5
5	T1	355	1.7	355	1.7	0.299	1.0	LOS A	0.6	4.5	0.34	0.17	0.34	54.3
6	R2	94	0.0	94	0.0	0.299	8.1	LOS A	0.6	4.5	0.34	0.17	0.34	54.3
Approach		513	1.2	513	1.2	0.299	3.1	NA	0.6	4.5	0.34	0.17	0.34	54.6
North: Corlette Street														
7	L2	20	0.0	20	0.0	0.156	9.2	LOS A	0.2	1.4	0.56	0.97	0.56	43.2
8	T1	39	0.0	39	0.0	0.156	15.0	LOS B	0.2	1.4	0.56	0.97	0.56	42.9
9	R2	9	0.0	9	0.0	0.156	15.6	LOS B	0.2	1.4	0.56	0.97	0.56	18.7
Approach		67	0.0	67	0.0	0.156	13.4	LOS A	0.2	1.4	0.56	0.97	0.56	41.8
West: Parkway Avenue														
10	L2	138	0.0	128	0.0	0.269	5.9	LOS A	0.1	0.8	0.07	0.17	0.07	46.4
11	T1	381	1.6	353	1.6	0.269	0.2	LOS A	0.1	0.8	0.07	0.17	0.07	57.0
12	R2	22	0.0	20	0.0	0.269	7.6	LOS A	0.1	0.8	0.07	0.17	0.07	53.7
Approach		541	1.1	501 ^{N1}	1.1	0.269	1.9	NA	0.1	0.8	0.07	0.17	0.07	56.0
All Vehicles		1167	1.2	1127 ^{N1}	1.2	0.299	3.7	NA	0.6	4.5	0.24	0.25	0.24	53.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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Project: C:\Work Documents\Projects\2020_027 - NGS Park Campus\Union Parkway Corlette.sip9

MOVEMENT SUMMARY

Site: 101 [Union Street 2021AM + dev - Stage 1 (Site Folder: General)]

Network: N101 [2021AM + development - Stage 1 (Network Folder: General)]

Union Street / Parkway Avenue traffic signals

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]	v/c	sec		[Veh. veh]	[Dist m]				km/h
South: Union Street														
1	L2	54	3.9	54	3.9	0.210	37.3	LOS C	4.4	31.7	0.70	0.64	0.70	37.9
2	T1	358	1.5	358	1.5	0.909	61.5	LOS E	16.5	117.4	0.89	0.92	1.08	19.8
3	R2	82	2.6	82	2.6	* 0.909	78.3	LOS F	16.5	117.4	0.96	1.02	1.23	17.7
Approach		494	1.9	494	1.9	0.909	61.6	LOS E	16.5	117.4	0.88	0.90	1.07	21.4
East: Parkway Avenue														
4	L2	41	7.7	41	7.7	0.047	16.6	LOS B	0.5	3.9	0.54	0.68	0.54	40.1
5	T1	296	0.0	296	0.0	0.618	50.0	LOS D	11.3	79.1	0.91	0.78	0.91	25.5
Approach		337	0.9	337	0.9	0.618	45.9	LOS D	11.3	79.1	0.87	0.77	0.87	26.7
North: Union Street														
7	L2	171	1.9	171	1.9	0.317	27.9	LOS B	3.3	23.4	0.82	0.77	0.82	10.2
8	T1	248	3.0	248	3.0	* 0.686	36.7	LOS C	7.7	54.9	0.97	0.86	0.97	29.3
9	R2	48	0.0	48	0.0	* 0.686	41.9	LOS C	7.7	54.9	0.97	0.86	0.97	28.6
Approach		467	2.3	467	2.3	0.686	34.0	LOS C	7.7	54.9	0.92	0.83	0.92	25.2
West: Parkway Avenue														
10	L2	156	4.1	156	4.1	0.316	52.4	LOS D	5.5	40.0	0.84	0.79	0.84	22.4
11	T1	393	1.1	393	1.1	* 0.931	77.2	LOS F	19.9	140.4	0.97	1.07	1.27	17.2
Approach		548	1.9	548	1.9	0.931	70.2	LOS E	19.9	140.4	0.94	0.99	1.15	18.4
All Vehicles		1846	1.8	1846	1.8	0.931	54.3	LOS D	19.9	140.4	0.90	0.89	1.02	22.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped]	[Dist m]			sec	m	m/sec
South: Union Street											
P1	Full	23	69.2	LOS F	0.1	0.1	0.96	0.96	234.7	215.2	0.92
East: Parkway Avenue											
P2	Full	14	31.8	LOS D	0.0	0.0	0.92	0.92	207.8	228.9	1.10
North: Union Street											
P3	Full	14	69.2	LOS F	0.1	0.1	0.96	0.96	234.7	215.2	0.92
West: Parkway Avenue											
P4	Full	38	69.2	LOS F	0.2	0.2	0.96	0.96	247.8	232.2	0.94

MOVEMENT SUMMARY

Site: 101 [Union Street 2021PM + dev - Stage 1 (Site Folder: General)]

Network: N101 [2021PM + development - Stage 1 (Network Folder: General)]

Union Street / Parkway Avenue traffic signals

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 130 seconds (Site Practical Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total HV] veh/h	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Union Street														
1	L2	46	0.0	46	0.0	0.207	48.9	LOS D	2.8	19.8	0.85	0.72	0.85	33.6
2	T1	223	1.9	223	1.9	0.894	64.7	LOS E	10.3	73.8	0.97	0.97	1.24	19.1
3	R2	59	3.6	59	3.6	*0.894	75.3	LOS F	10.3	73.8	1.00	1.03	1.33	18.2
Approach		328	1.9	328	1.9	0.894	64.4	LOS E	10.3	73.8	0.96	0.95	1.20	21.2
East: Parkway Avenue														
4	L2	55	3.8	55	3.8	0.094	22.8	LOS B	0.8	5.5	0.73	0.71	0.73	36.3
5	T1	248	0.8	248	0.8	0.741	53.7	LOS D	9.2	64.8	0.97	0.86	1.04	24.5
Approach		303	1.4	303	1.4	0.741	48.1	LOS D	9.2	64.8	0.93	0.83	0.98	26.0
North: Union Street														
7	L2	177	0.6	177	0.6	0.444	53.1	LOS D	6.0	42.2	0.92	0.80	0.92	5.9
8	T1	301	4.2	301	4.2	*0.678	25.8	LOS B	7.6	54.9	0.94	0.83	0.94	34.4
9	R2	61	3.4	61	3.4	*0.678	31.0	LOS C	7.6	54.9	0.94	0.83	0.94	33.3
Approach		539	2.9	539	2.9	0.678	35.4	LOS C	7.6	54.9	0.93	0.82	0.93	25.3
West: Parkway Avenue														
10	L2	87	3.6	87	3.6	0.101	25.6	LOS B	1.8	13.2	0.58	0.71	0.58	33.1
11	T1	309	0.7	309	0.7	*0.904	68.7	LOS E	13.5	95.2	1.00	1.05	1.31	18.7
Approach		397	1.3	397	1.3	0.904	59.2	LOS E	13.5	95.2	0.91	0.98	1.15	20.6
All Vehicles		1567	2.0	1567	2.0	0.904	49.9	LOS D	13.5	95.2	0.93	0.89	1.05	23.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Union Street											
P1	Full	7	59.2	LOS E	0.0	0.0	0.95	0.95	224.7	215.2	0.96
East: Parkway Avenue											
P2	Full	36	27.0	LOS C	0.1	0.1	0.91	0.91	203.1	228.9	1.13
North: Union Street											
P3	Full	26	59.2	LOS E	0.1	0.1	0.95	0.95	224.7	215.2	0.96
West: Parkway Avenue											
P4	Full	24	59.2	LOS E	0.1	0.1	0.95	0.95	237.8	232.2	0.98

ATTACHMENT E

KISS AND RIDE TRAFFIC MANAGEMENT PLAN



NEWCASTLE GRAMMAR SCHOOL – PARK CAMPUS

**LOT 102 DP861562
127 UNION STREET, COOKS HILL**

PREPARED FOR: NEWCASTLE GRAMMAR SCHOOL

AMENDED APRIL 2022

REF: 20/027

**TRAFFIC MANAGEMENT PLAN
NEWCASTLE GRAMMAR SCHOOL – PARK CAMPUS
LOT 102 DP 861562
127 UNION STREET, COOKS HILL**

Intersect Traffic Pty Ltd (ABN: 43 112 606 952)

Address:16 Mount Harris Drive
Maitland Vale NSW 2320
PO Box 268
East Maitland NSW 2323**Contact:**(Mob) 0423 324 188
Email: jeff@intersecttraffic.com.au**QUALITY ASSURANCE**

This document has been prepared, checked and released in accordance with the Quality Control Standards established by Intersect Traffic Pty Ltd.

Issue	Date	Description	By
A	19/04/21	Draft	JG
B	19/04/21	Edit	JG
C	30/03/22	Final Proof/ Client Comments	JG
D	30/03/22	Approved	JG

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This document has been authorised by

Date 30th March 2022**Disclaimer**

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SCHOOL TRAFFIC MANAGEMENT PLAN

1. Traffic Management Plan Responsibility.

The preparation and implementation of the schools Traffic Management Plan will be the Principal of the school or nominated representative. The Principal or nominated representative will have the following responsibilities;

- ◆ Prepare, implement, review and modify the schools traffic management plan;
- ◆ Consult with and seek guidance from representatives of Maitland City Council, Newcastle Transport (Keolis Downer), NSW Police and Department of Transport regarding the plan's modification and implementation;
- ◆ Ensure all school crossings are managed at all times utilising the full TfNSW requirements for a school crossing e.g. use of crossing flags, safety vests etc.
- ◆ Communicate the plan to staff, parents and students; and
- ◆ Ensure the actions within the plans are undertaken and enforced

2. Available On-street Parking Areas for set down and pick-up of children.

Figure 3 below identifies the available parking areas for the setting down and picking up of children within 200 metres of the school site noting the school will arrange students to be marshalled to the remote parking areas by teachers to ensure the safety of the children. The school is encouraged to liaise with Newcastle City Council to consider some on-street 5 minute kiss and ride parking areas to compliment the proposed on-site kiss and ride facility.



Figure 3 – Available Parking Areas – Set down & pick-up of children

3. *Car Parking and Kiss and Ride Rules*

The rules for car parking when setting down and picking up children are;

- ◆ Do not park illegally within disabled car parking spaces,
- ◆ Do not park illegally in staff parking areas,
- ◆ Do not park illegally across local resident driveways;
- ◆ Do not park for longer than 2 minutes within the school's on-site kiss and ride facility during set-down and pick up times identified within the signposting within the facility;
- ◆ Do not park illegally contrary to parking regulation signage particularly near school pedestrian crossings;
- ◆ Do not queue on the road at the entry to the on-site school kiss and ride as this impedes traffic and is an illegal traffic manoeuvre;
- ◆ Driver must not leave vehicle staying within 3 metres of vehicle;
- ◆ Do not overtake another vehicle within the kiss and ride;
- ◆ Ensure child gets in or out of the vehicle on the kerb side and that all children under the age of 13 years travel in the back seat;
- ◆ Ensure bags are ready prior to dropping off in the kiss and ride;
- ◆ Students being collected at the kiss and ride gather at the designated meeting point after school under teacher supervision;
- ◆ Students are to wait at the designated meeting area under teacher supervision;
- ◆ Students are not to play or walk around the kiss and ride zone;
- ◆ Students are instructed and reminded by teachers to watch for their collection car;
- ◆ When all cars are in position and have stopped, teachers will direct students to walk to their cars.

Further the school provides staff for supervision of the kiss and ride area and undertakes regular education of staff and students as detailed in **Section 5** below.

4. *Public Transport and Active Travel*

This traffic management plan encourages the use of public transport and active travel for students to and from school. In this regard it is noted that;

- ◆ The school provides a free school bus service to and from most local areas. Details of the school bus services which are expanding each year are available from the Schools administration office. Further state funded school services are also available for travel to school with details available from Newcastle Transport (Keolis Downer).
- ◆ The school also encourages students to participate in the School Student Transport Scheme (SSTS) whereby students receive free or subsidised public transport for travel to and from School. Details are available from the school office.
- ◆ The adjoining Cooks Hill, Hamilton South and The Junction residential areas have an excellent network of pedestrian footpaths;
- ◆ The school will be providing upgraded end of trip facilities for bicycle travel with showers, amenities, lockers and secure bicycle storage facilities for staff and students; and
- ◆ The school would be willing to help any parents wishing to set up and implement walking school bus programs in the adjoining residential areas and in particular provide the services of teachers to marshal and direct groups of children walking from the school in the afternoon to designated meeting points within 100 metres of the school. More information for parents on walking school buses is available at www.walkingschoolbus.org.

More information on Public Transport and Active Travel to and from the school can be obtained by contacting the school's administration or the school principal and is contained in the staff and parent's handbooks provided each year.

The rules and procedures for public transport use are as follows;

- All school buses arrive and depart from the Parkway Avenue bus stop. Public Transport buses will utilise the Union Street bus stop adjacent to the site.
- In the morning buses arrive at the school between 8.15 am and 8.45 am and drop the children at the Parkway Avenue bus zone and children then enter the school grounds immediately via the Parkway Avenue school entry;
- Students using the public transport buses will utilise the Union Street entry to the school. In the afternoon the students will walk from the school to the appropriate Union Street bus stop accompanied by a teacher after meeting within the school at the designated meeting point;
- Children line up at the designated meeting point in the afternoon according to bus routes / numbers and are escorted to the Parkway Avenue bus zone as the buses arrive between 2.45 pm and 3.20 pm.

In regard to students walking and cycling to the school they are required to abide by the following rules;

Safety of students as they travel to and from school each day is important. It is expected that parents / carers, grandparents and family members will support the school through role modelling safe road use behaviours such as;

- *Using designated footpaths or walking in areas away from the road;*
- *Holding the children's hand (for those up to 8 years of age) and actively supervising all children as they walk to and from school.*
- *Teaching children to stop, look, listen and think every time they cross the road;*
- *Walking with children to cross-roads (do not call children across the road);*
- *Crossing roads away from parked cars;*
- *Parking correctly in designated areas;*
- *Getting children in and out of the car on the footpath side;*
- *Using seatbelt restraints for all passengers before driving away;*
- *Waiting safely at bus stops and waiting until bus has gone and choosing a safe place to cross the road.*

Parent / carers and family members are encouraged to walk with their child to school to reduce traffic congestion around the school, to promote physical activity and to teach children about correct road use behaviours.

There will be 3 points of entry into Newcastle Grammar School Park Campus for Kindergarten to Year 6 these are;

- *Pedestrian access gate – Parkway Avenue – for bus arrivals and departures. This access gate is only supervised for departures.*
- *A pedestrian access gate on Union Street. This is access for walkers and riders as well as for parents to use for "in-school pick up"; and*
- *A pedestrian access gate on Corlette Street. This is access for walkers and riders as well as for parents to use for "in-school pick up".*

Parents/carers, family members and students are expected to use the available pedestrian facilities around the school to cross the road. These include the signalised pedestrian crossings at the Union Street / Parkway Avenue intersection. Where no pedestrian crossing facilities are available parents/carers, family members and students should stop, look, listen, think before crossing the road and cross in an area away from parked cars and especially buses. Walk quickly and directly across the road.

To improve and encourage Active Travel the school commits to;

- Continuing to educate drivers who do not follow the road rules and parking restrictions around the school precinct. In this respect the local police assistance will continue to be sought.
- Encouraging students to ride or walk to school.; and
- Encourage students to use the School Student Transport Scheme (SSTS).

5. *Action Plan*

The following Action Plan has been developed to implement the schools Traffic Management Plan;

1. Ensure this traffic management plan is communicated to all parents and students through inclusion in all school information sessions and orientations.
2. Ensure the objectives of the plan are regularly reinforced to parents and students through information within regular school communications such as weekly or monthly newsletters and / or principal messages. This is to include details of any issues arising from the operation of the Traffic Management Plan as a means of enforcement of the plan.
3. Roster and train suitable numbers of teachers to duties such as marshalling students and parents within the kiss and ride facility within the street to ensure students are set down or picked up in a timely and safe manner and that the 5-minute parking limit within the kiss and ride facility is strictly enforced.
4. Roster and train suitable numbers of teachers to lead and direct walking school buses from the school in the afternoon pick up period to suitable meeting points for parents within 100 metres of the school.
5. Ensure teachers undertaking marshalling and enforcement duties are suitable recognisable and provided with suitable personal protective gear. i.e. high visibility vests.
6. Should Council or the Police advise periodic enforcement of parking and driving regulations around the school is to occur the Principal is to advise the school community through a regular or special communication of this action being taken before the enforcement period commences.

6. *Contacts*

1. Emergency – Triple Zero (000) – Local police, ambulance and fire brigade;
2. School Principal (Mrs. Alisha Dyer) and Administration Office - (02) 49252121 or e-mail: office@ngs.nsw.edu.au.
3. Newcastle Police – (02) 4929 0999.
4. Newcastle City Council Traffic Co-ordinator – Jocelyn Cardona – (02) 497472666.
5. Newcastle Transport – 131500.
6. Walking School Buses - www.walkingschoolbus.org.

ATTACHMENT F

ITE TRAFFIC GENERATION RATES

INSTITUTE OF TRANSPORTATION ENGINEERS COMMON TRIP GENERATION RATES (PM Peak Hour)

(Trip Generation Manual, 10th Edition)

Code	Description	Unit of Measure	Trips Per Unit	Setting/Location General Urban/ Suburban	Dense Multi- Use Urban
PORT AND TERMINAL					
30	Intermodal Truck Terminal	1,000 SF GFA	1.72		
90	Park-and-Ride Lot with Bus Service	Parking Spaces	0.43		
INDUSTRIAL					
110	General Light Industrial	1,000 SF GFA	0.63		
130	Industrial Park	1,000 SF GFA	0.40		
140	Manufacturing	1,000 SF GFA	0.67		
150	Warehousing	1,000 SF GFA	0.19		
151	Mini-Warehouse	1,000 SF GFA	0.17		
154	High-Cube Transload & Short-Term Storage Warehouse	1,000 SF GFA	0.10		
155	High-Cube Fulfillment Center Warehouse	1,000 SF GFA	1.37		
156	High-Cube Parcel Hub Warehouse	1,000 SF GFA	0.64		
157	High-Cube Cold Storage Warehouse	1,000 SF GFA	0.12		
160	Data Center	1,000 SF GFA	0.09		
170	UI/Flex	1,000 SF GFA	2.27		
180	Specialty Trade Contractor	1,000 SF GFA	1.97		
RESIDENTIAL					
210	Single-Family Detached Housing	Dwelling Units	0.89		
220	Multifamily Housing (Low-Rise)	Dwelling Units	0.56		
221	Multifamily Housing (Mid-Rise)	Dwelling Units	→	0.44	0.18
222	Multifamily Housing (High-Rise)	Dwelling Units	→	0.36	0.19
231	Mid-Rise Residential with 1st-Floor Commercial	Dwelling Units	0.36		
232	High-Rise Residential with 1st-Floor Commercial	Dwelling Units	0.21		
240	Mobile Home Park	Dwelling Units	0.46		
251	Senior Adult Housing - Detached	Dwelling Units	0.30		
252	Senior Adult Housing - Attached	Dwelling Units	0.26		
253	Congregate Care Facility	Dwelling Units	0.18		
254	Assisted Living	1,000 SF GFA	0.48		
255	Continuing Care Retirement Community	Units	0.16		
260	Recreation Homes	Dwelling Units	0.28		
265	Timeshare	Dwelling Units	0.83		
270	Residential Planned Unit Development	Dwelling Units	0.69		
LODGING					
310	Hotel	Rooms	0.60		
311	All Suits Hotel	Rooms	→	0.36	0.17
312	Business Hotel	Rooms	0.32		
320	Motel	Rooms	0.38		
330	Resort Hotel	Rooms	0.41		
RECREATIONAL					
411	Public Park	Acres	0.11		
416	Campground / Recreation Vehicle Park	Acres	0.88		
420	Marina	Berths	0.21		
430	Golf Course	Acres	0.28		
431	Miniature Golf Course	Holes	0.33		
Code					
Description					
Unit of Measure					
Trips Per Unit					
Setting/Location					
General Urban/ Suburban					
Dense Multi- Use Urban					
432	Golf Driving Range	Tees/Driving Positions	1.25		
433	Batting Cages	Cages	2.22		
434	Rock Climbing Gym	1,000 SF GFA	1.64		
435	Multi-Purpose Recreational Facility	1,000 SF GFA	3.58		
436	Trampoline Park	1,000 SF GFA	1.50		
437	Bowling Alley	1,000 SF GFA	1.16		
440	Adult Cabaret	1,000 SF GFA	2.93		
444	Movie Theater	1,000 SF GFA	6.17		
445	Multiplex Movie Theater	1,000 SF GFA	4.91		
452	Horse Racetrack	Seats	0.06		
454	Dog Racetrack	Attendees	0.15		
460	Arena	1,000 SF GFA	0.47		
462	Professional Baseball Stadium	Attendees	0.15		
465	Ice Skating Rink	1,000 SF GFA	1.33		
466	Snow Ski Area	Slopes	26.00		
473	Casino/Video Lottery Establishment	1,000 SF GFA	13.49		
480	Amusement Park	Acres	3.95		
482	Water Slide Park	Parking Spaces	0.28		
488	Soccer Complex	Fields	16.43		
490	Tennis Courts	Courts	4.21		
491	Racquet/Tennis Club	Courts	3.82		
492	Health/Fitness Club	1,000 SF GFA	3.45		
493	Athletic Club	1,000 SF GFA	6.29		
495	Recreational Community Center	1,000 SF GFA	2.31		
INSTITUTIONAL					
520	Elementary School	1,000 SF GFA	1.37		
522	Middle School / Junior High School	1,000 SF GFA	1.19		
530	High School	1,000 SF GFA	0.97		
534	Private School (K-8)	Students	0.26		
536	Private School (K-12)	Students	0.17		
537	Charter Elementary School	Students	0.14		
538	School District Office	1,000 SF GFA	2.04		
540	Junior / Community College	1,000 SF GFA	1.86		
550	University/College	1,000 SF GFA	1.17		
560	Church	1,000 SF GFA	0.49		
561	Synagogue	1,000 SF GFA	2.82		
562	Mosque	1,000 SF GFA	4.22		
565	Daycare Center	1,000 SF GFA	11.12		
566	Cemetery	Acres	0.46		
571	Prison	1,000 SF GFA	2.91		
575	Fire and Rescue Station	1,000 SF GFA	0.48		
580	Museum	1,000 SF GFA	0.18		
590	Library	1,000 SF GFA	8.16		

ATTACHMENT G

CONCEPT CONSTRUCTION TRAFFIC AND PEDESTRIAN MANAGEMENT PLAN.

CONCEPT CONSTRUCTION TRAFFIC & PEDESTRIAN MANAGEMENT PLAN



NEWCASTLE GRAMMAR SCHOOL – PARK CAMPUS
127 UNION STREET, COOKS HILL

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Attachment 1 - Site Plan - Construction Stage 1

1.0 INTRODUCTION

This document provides concept details of the management of traffic and pedestrian movements to be implemented during construction of the proposed additions to the Newcastle Grammar School – Park Campus – Stage 1. The project generally involves the site preparation including demolition of existing structures and construction of 1 new school buildings, associated car parking and landscaping.

- Site establishment
- Demolition of existing buildings
- Installation of driveway crossings and construction of 'Kiss and Ride' laneway.
- Earthworks
- Reinforced concrete pits and slabs
- Brickwork
- Metal roofing
- Temporary car park
- Storm water and civil drainage
- Pavement & landscaping
- Electrical installations
- Framing, linings
- Internal and external finishes

The plan covers the following areas:

- Ingress and egress of vehicles to the site.
- Details on loading and unloading zones.
- Onsite parking measures during construction.
- Pedestrian management strategies.

Normal working hours should be between the following:

1. Between 7:00 am and 6:00 pm, Mondays to Fridays inclusive;
2. 8:00 am and 1:00 pm, Saturdays,
3. No work on Sundays, public holidays or on a Saturday or Sunday adjacent to a public holiday.

If works are required to be undertaken outside these hours approval will be obtained from the Project Manager prior to the carrying out of the works. The site plan showing construction areas, storage areas and access points is provided in **Attachment 1**. The intention is to where possible undertake a large portion of the construction works either within the 7 week end of year school break (December / January) or the 3 week mid-year school break (June / July) to minimise the impact of the construction works on the operation of the school.

This plan seeks to have Newcastle City Council's Traffic Committee approve Construction Zones on Union Street along the school frontage (Parkway Avenue to a point 90 metres north of Parkway Avenue) for Stage 1 construction works and on Corlette Street along the school frontage (Parkway Avenue to a point 90 metres north of Parkway Avenue) for Stage 2 construction works. The Union Street construction zone will require the temporary relocation of a bus stop located within this zone to a point 90 metres north of the existing bus stop.

Note this plan and the staging plan for the works will be further developed in consultation with the builder and Council during the Construction Certificate and Construction stages of the project.

2.0 INGRESS AND EGRESS OF VEHICLES TO THE SITE

The factors that have been considered in preparing this Construction Traffic Management Plan are:*

- The work site has direct frontage to local roads (Union Street, Parkway Avenue and Corlette Street).
- There will be limited on site car parking provided.
- All deliveries and workers will approach the site via Union Street and Parkway Avenue.

The builder will employ the use of a professional traffic control crew when there will be impacts on the local traffic and pedestrian flow. As part of the pre-works setup, the professional traffic crew will develop and implement a traffic management plan specific to the task at hand, based on the parameters of the Construction Traffic Management Plan adopted in this document and approval from the relevant authorities.

All materials delivered to the site will use the arterial and sub-arterial road network as well as the major collector roads in the area to access the site. All deliveries will enter the construction site via Parkway Avenue and Corlette Street and exit the site via Union Street with a left turn out only movement. Deliveries will be outside peak road network / school times to minimise impacts on light vehicles and nearby residents.

Likely delivery routes to be used noting that it will depend on the successful tenderer as to which routes are ultimately used based on the location the successful tenderers suppliers are;

From the south – Pacific Highway, Glebe Road, Union Street, Parkway Avenue, Corlette Street or Pacific Highway, Parkway Avenue, Corlette Street.

From the west - New England Highway, Pacific Highway, Industrial Drive, Hannell Street, Stewart Avenue, Parkway Avenue, Corlette Street or M1 Pacific Motorway, Link Road, Wallsend Road, Griffiths Road, Lambton Road, Donald Street, Parry Street, Stewart Avenue, Parkway Avenue, Corlette Street or Hunter Expressway Link Road, Wallsend Road, Griffiths Road, Lambton Road, Donald Street, Parry Street, Stewart Avenue, Parkway Avenue, Corlette Street.

From the north – Pacific Highway, Industrial Drive, Stewart Avenue, Parkway Avenue, Corlette Street or Nelson Bay Road, Teal Street, Cormorant Road, Tourle Street, Industrial Drive, Hannell Street, Stewart Avenue, Parkway Avenue, Corlette Street.

It is highly unlikely any deliveries will approach the site from the east. All these roads are considered suitable to convey the delivery vehicles servicing the construction site.

3.0 DETAILS OF LOADING AND UNLOADING ZONES

Union Street will be the primary access for deliveries, loading and unloading, and heavy logistics associated with the construction work for Stage 1 while the primary access for Stage 2 will be Corlette Street. Wherever possible all loading / unloading will occur onsite via a temporary construction access via Corlette Street. Any loading / unloading on Union Street and Corlette Street will be carried out within an approved Construction Zone and under traffic control in non-peak traffic hours (before 8 am and between 9 am & 3 pm). No unloading / loading will occur in Parkway Avenue in the vicinity of the school's bus set down and drop off zones and the major pedestrian access points to the school. No amendments are required to the school bus zones as a result of construction.

While details need to be confirmed with the contractor to be engaged to undertake the construction works, the types of vehicles are anticipated to be specific to the nature of the site and the need to reduce any impacts to the ongoing operation of the School.

4.0 DURING CONSTRUCTION A RANGE OF CONSTRUCTION

Vehicles would access the site. It is anticipated that the largest vehicles that would typically access the site would be 12.5-metre heavy rigid vehicles and at certain stages a large mobile crane may be required. It is expected that no more than 10 heavy vehicles would be needed at the site per day, however on average less movements would be required. pedestrian traffic management methods.

Construction may interfere with pedestrian movements along the school frontage in Union Street (Stage 1) and Corlette Street (Stage 2) during loading and unloading of deliveries and waste within an approved Construction Zone. However with deliveries restricted to before 8 am and between 9 am and 3 pm the peak pedestrian traffic periods are avoided and the impact of the construction on pedestrian movements is minimised.

At all times however traffic marshals will monitor and restrict pedestrian movements through the construction zone when necessary to ensure the safety of pedestrians. The marshal's will guide pedestrians safely through or around the construction zone. Where necessary pedestrians will be protected by fencing or concrete barriers with a safe travel route identified with hi-vis bunting. Prior to commencement of construction a pedestrian movement management plan will be prepared by the building contractor for each stage of the works and implemented during construction. The construction site itself will be suitable fenced off to prohibit unauthorised pedestrians from the road or within the school accessing the construction site.

5.0 PARKING MEASURES DURING CONSTRUCTION

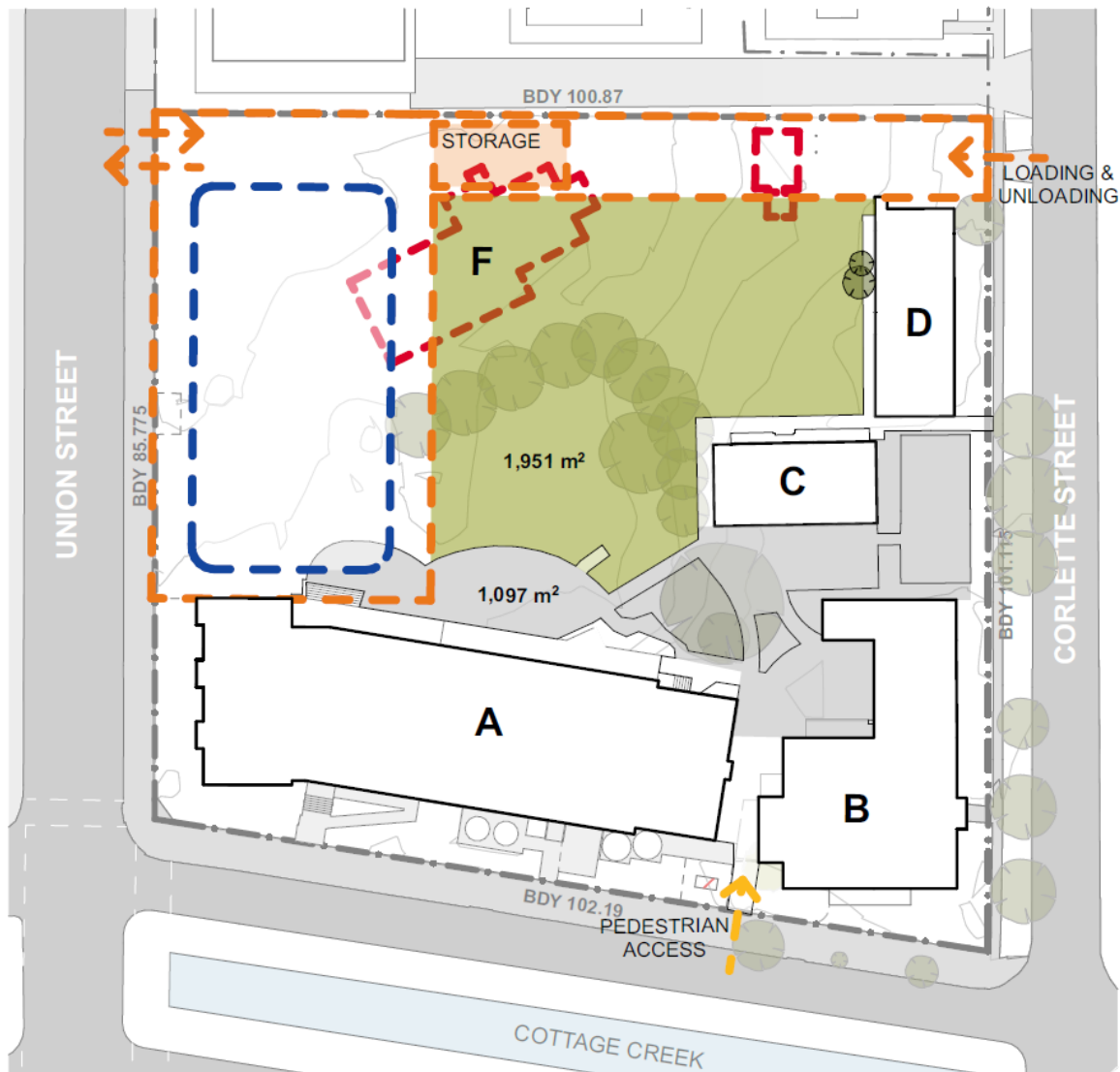
The site is restricted in terms of area due to the requirement that the school still needs to operate during construction and there will be limited parking available on-site and within an approved construction zone in Union Street or Corlette Street. Only essential employee vehicles will be allowed to park in these areas i.e. tradesmen vehicles carrying tools and / or product. Non-essential employee vehicles will be required to park in the northern end of the Bar Beach public car park approximately 850 metres east of the construction site.

Construction employees will be shuttled between the site and car park using available essential construction vehicles allowed to park within the construction zone. Site induction documentation will alert all construction employees and contractors of the parking restrictions to minimise the impact of construction on Union Street and Corlette Street residents.

6.0 TRAFFIC CONTROL SIGNS

During construction Parkway Avenue, Union Street and Corlette Street will be subject to construction traffic impacts and as such reduced daylight hours speed zones should be in place along the school frontage during construction. This will be included in a construction zone application to Newcastle City Council's traffic committee prior to commencement of construction activities on the site. Advance warning signs on Union Street, Corlette Street and Parkway Avenue will be required in accordance with a traffic control plan prepared for the building contractor as part of Construction Certificate documentation and implemented prior to the start of any construction works. Suitably accredited traffic marshals from professional Traffic Control companies will be employed to install and maintain the signage as well as monitor and control vehicle and pedestrian traffic through the construction zones during construction.

Site Plan – Construction – Stage 1.



Stage 01 During Construction

LEGEND

-  - EXISTING PERMANENT BUILDINGS
-  - EXISTING BUILDINGS TO BE DEMOLISHED
-  - CONSTRUCTION ZONE AREA
-  - BUILDINGS UNDER CONSTRUCTION
-  - OUTDOOR PLAY SPACE HARDSTAND
-  - OUTDOOR PLAY SPACE LANDSCAPE
-  - EXISTING SITE TREES
-  - PROPOSED SITE TREES